

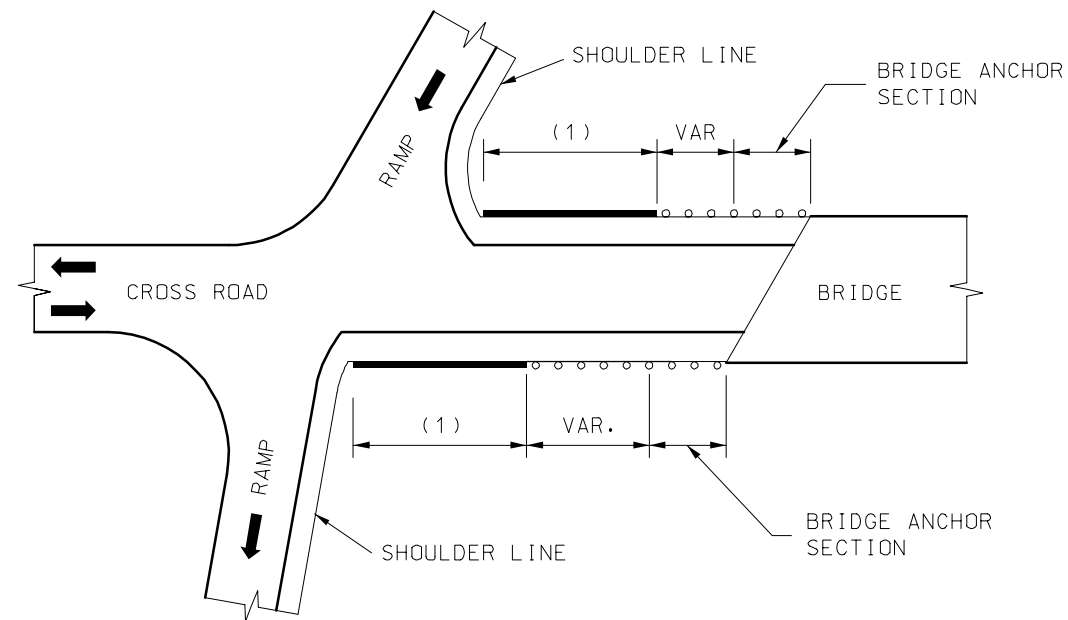


AT OBSTACLES

FOR MULTIPLE OBSTACLES - SPECIFY VAR. IN 3810 mm INCREMENTS.

GUARDRAIL LOCATIONS

LEGEND



BRIDGE ENDS GUARDRAIL LOCATION AT INTERCHANGE



-
- Diagram illustrating the cross-section of a Type A Guardrail. The diagram shows the guardrail structure, including the normal edge of the shoulder and the Type A guardrail. Key dimensions and components are labeled:
- 1200 MIN.**: Minimum distance from the guardrail to the obstacle.
 - OBSTACLE**: A vertical structure representing a potential hazard.
 - 535**: Vertical dimension of the guardrail height.
 - SHOULDER SLOPE**: The slope of the shoulder area.
 - WIDEN SHOULDER MINIMUM 1040 mm (2)**: Minimum width of the widened shoulder area.
 - ALL SLOPES**: Indicated for the shoulder slope.
 - NORMAL EDGE OF SHOULDER**: The edge of the shoulder before widening.
 - TYPE A GUARDRAIL**: The specific guardrail design.

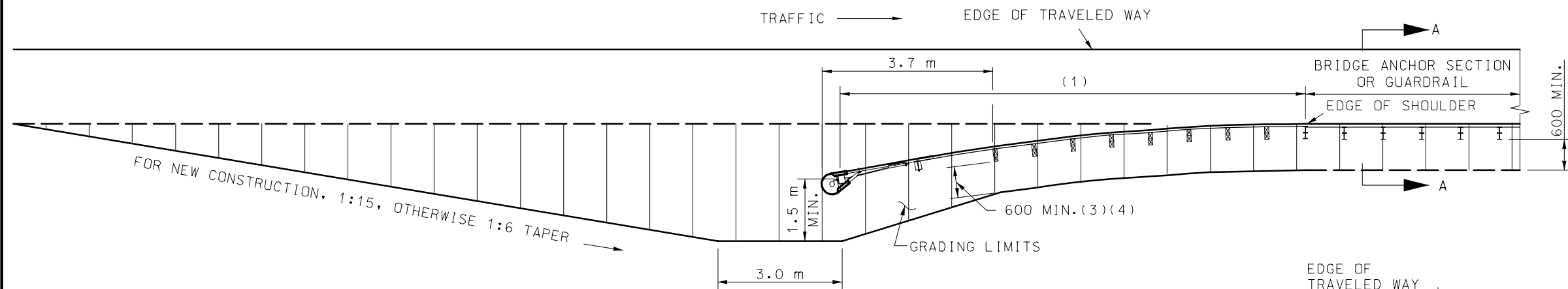
LOCATION OTHER THAN C MEDIAN

LATERAL PLACEMENT OF GUARDRAIL FOR SHOULDER INSTALLATION

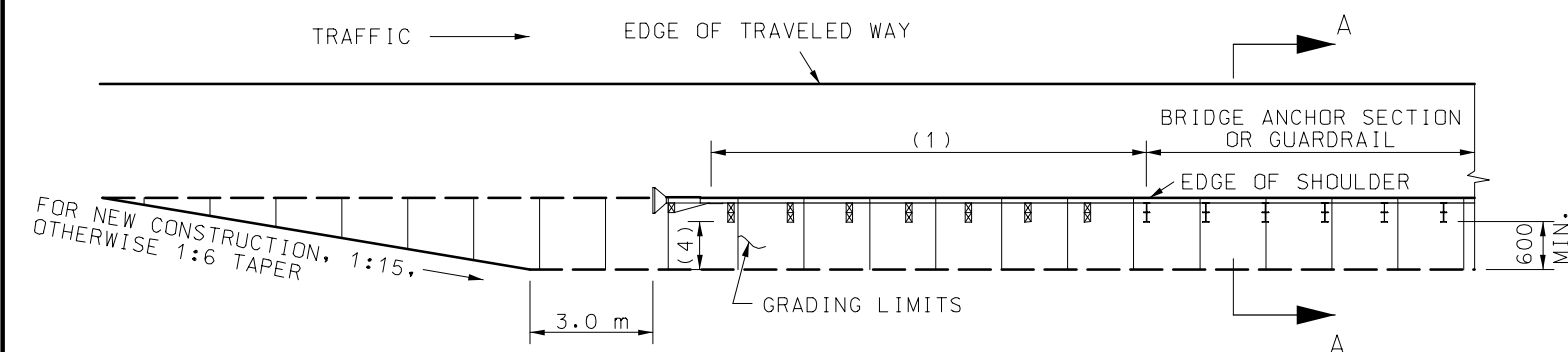
GENERAL NOTE:

ALL DIMENSIONS SHOWN ARE IN mm UNLESS OTHERWISE NOTED.

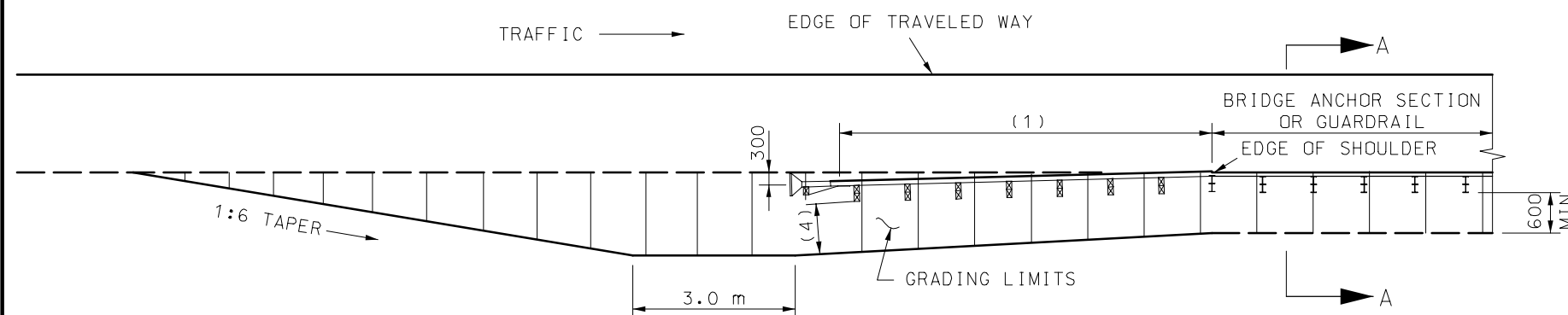
MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION			
	GUARDRAIL		
DATE: _____	EFFECTIVE: 01-01-2005	M606.00AR	1 16



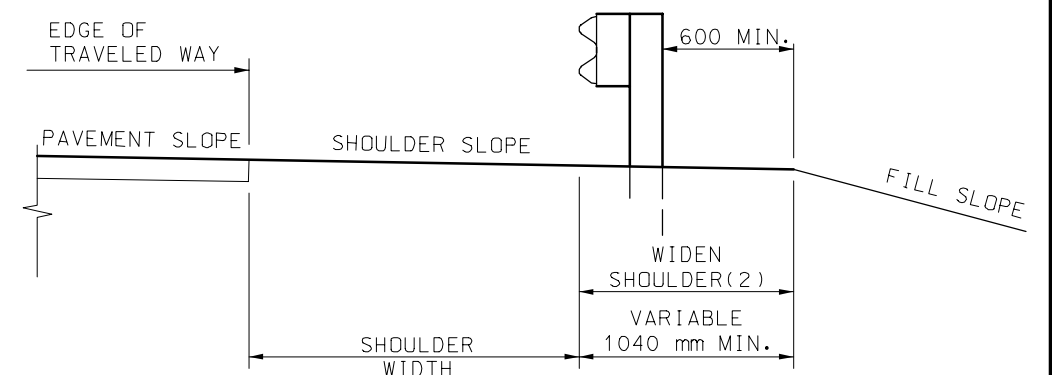
GRADING LIMITS FOR TYPE A FLARED CRASHWORTHY END TERMINAL



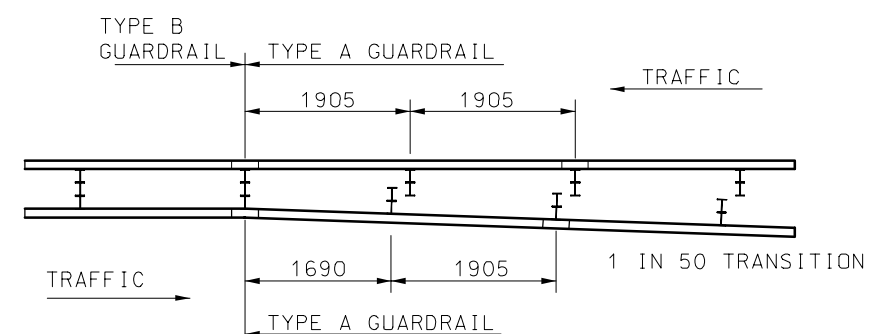
GRADING LIMITS FOR TYPE A NON-FLARED CRASHWORTHY END TERMINAL



GRADING LIMITS FOR TYPE A NON-FLARED OFFSET CRASHWORTHY END TERMINAL



SECTION A-A



**DETAIL FOR TRANSITIONING
BETWEEN TYPE A AND TYPE B GUARDRAIL**

GENERAL NOTES:

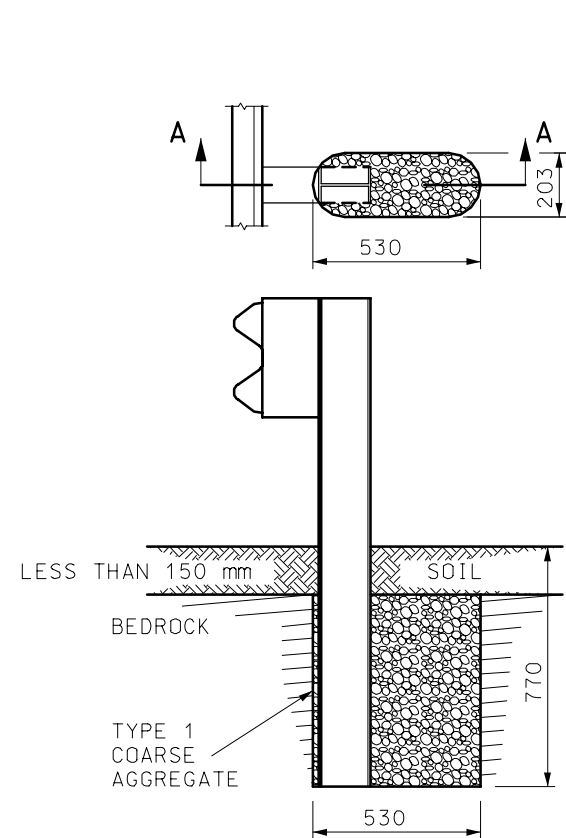
ALL DIMENSIONS ARE SHOWN IN mm UNLESS OTHERWISE NOTED.

THE CONTRACTOR SHALL PROVIDE THE ENGINEER WITH APPROVED SHOP DRAWINGS OF THE APPROVED CRASHWORTHY END TERMINAL.

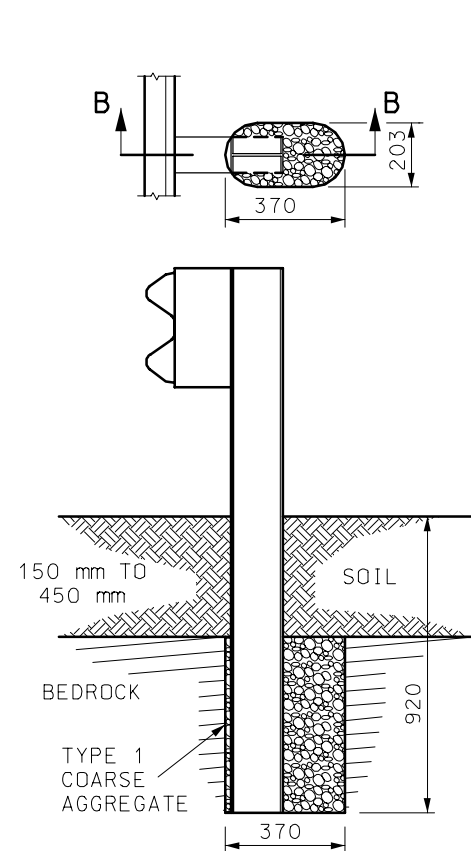
END ANCHORS SHALL BE INSTALLED ON ENDS OF GUARDRAIL RUNS WHERE CRASHWORTHY END TERMINAL IS NOT REQUIRED.

- (1) APPROVED TYPE A CRASHWORTHY END TERMINAL.
- (2) SHOULDER WIDENING SHALL CONSIST OF EMBANKMENT MATERIAL COMPACTED IN ACCORDANCE WITH SECTION 203.4 OF THE STANDARD SPECIFICATIONS.
- (3) THE SLOPE SHOULD BREAK BEHIND THIRD POST.
- (4) AS PER MANUFACTURER'S SPECIFICATIONS, 600 mm MINIMUM. NO DIRECT PAY.

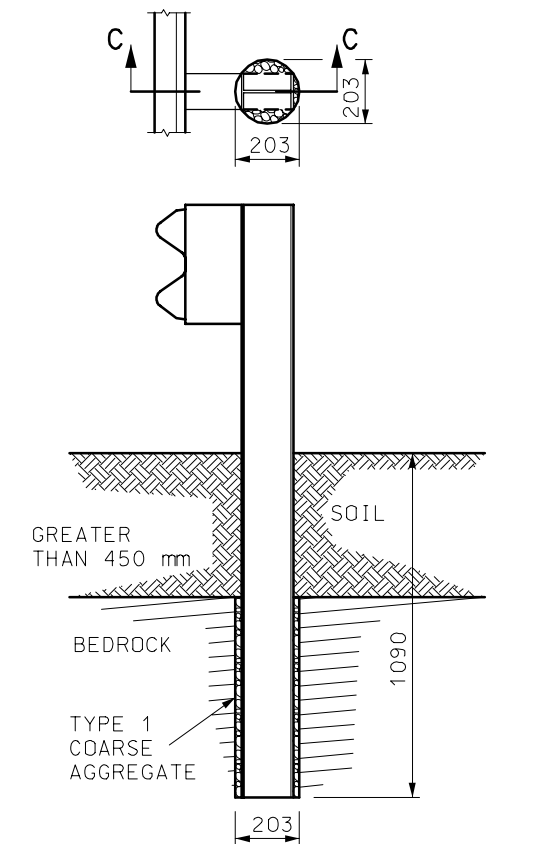
MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION			
GUARDRAIL			
DATE: _____	EFFECTIVE: 01-01-2005	M606.00AR	2
			16



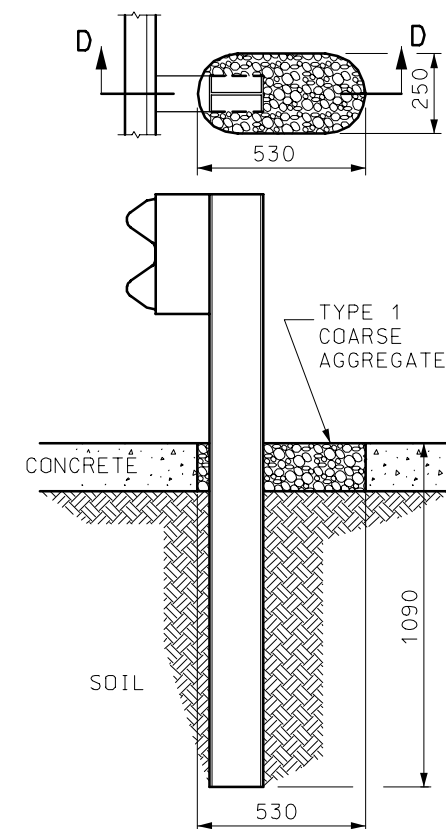
SECTION A-A
ROCK ENCOUNTERED
UP TO 150 mm BENEATH SURFACE



SECTION B-B
ROCK ENCOUNTERED
150 mm TO 450 mm BENEATH SURFACE

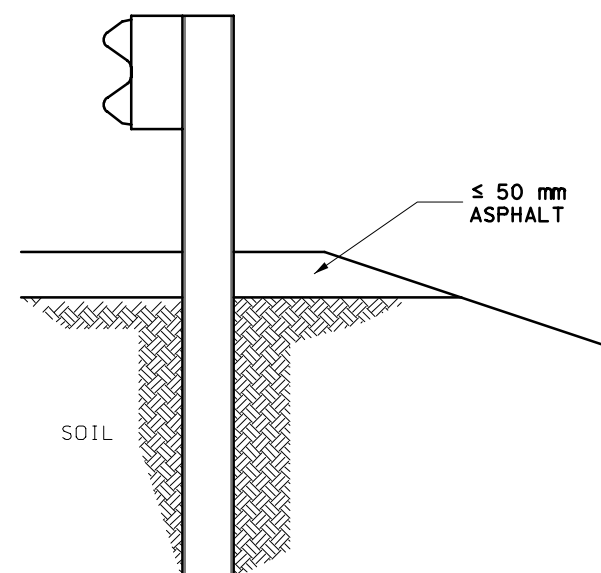


SECTION C-C
ROCK ENCOUNTERED MORE
THAN 450 mm BENEATH SURFACE



SECTION D-D
SETTING POST THROUGH CONCRETE

SETTING POST IN SOLID ROCK



SETTING POST THROUGH ASPHALT

GENERAL NOTES:

ALL DIMENSIONS SHOWN ARE IN mm UNLESS OTHERWISE NOTED.

HOLES IN SOLID ROCK SHALL PROVIDE A DIAMETER OF NOT LESS THAN 100 mm GREATER THAN THE MAXIMUM TRANSVERSE DIMENSION OF THE POST SECTION.

POST MAY BE SHORTER WHERE PLACED IN 600 mm OF SOLID ROCK. STEEL POSTS MAY BE FLAME OR SAW CUT. REPAIR OF CUT SHALL BE IN ACCORDANCE WITH SECTION 712 OF THE STANDARD SPECIFICATIONS.

MISSOURI HIGHWAYS AND TRANSPORTATION
COMMISSION

GUARDRAIL
SETTING POST IN SOLID
ROCK AND THROUGH
CONCRETE OR ASPHALT

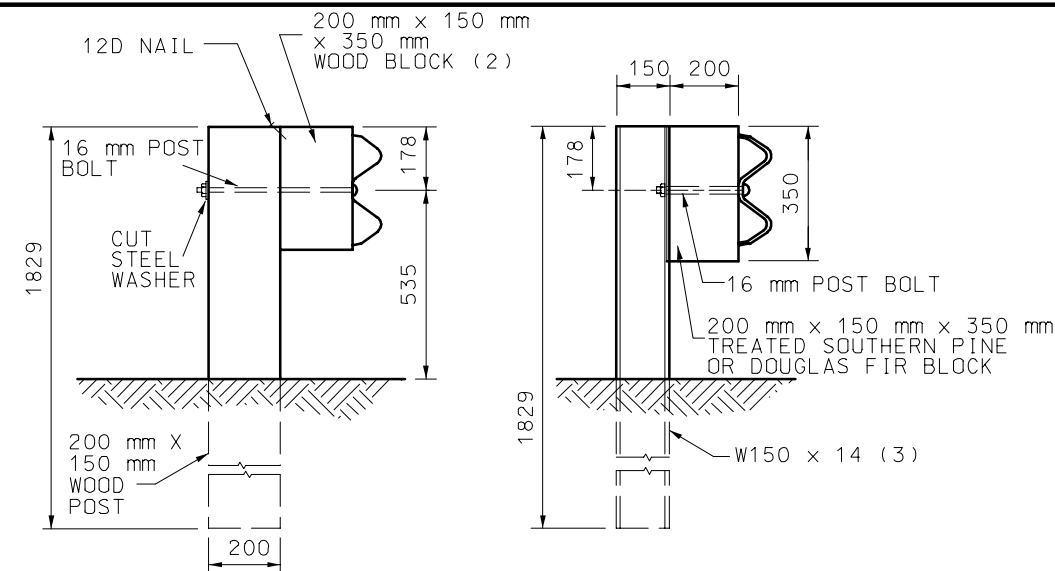
DATE: _____

EFFECTIVE: 01-01-2005

M606.00AR

3

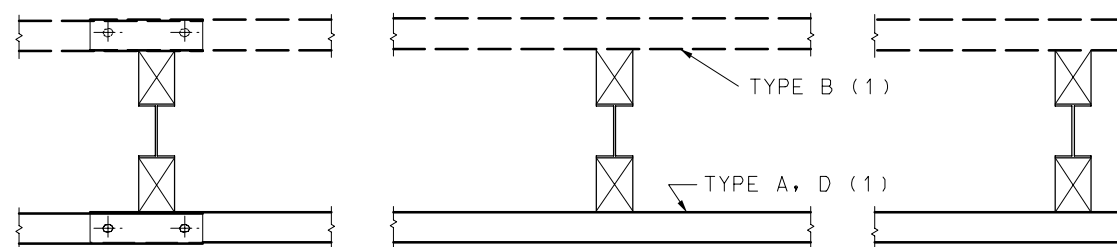
16



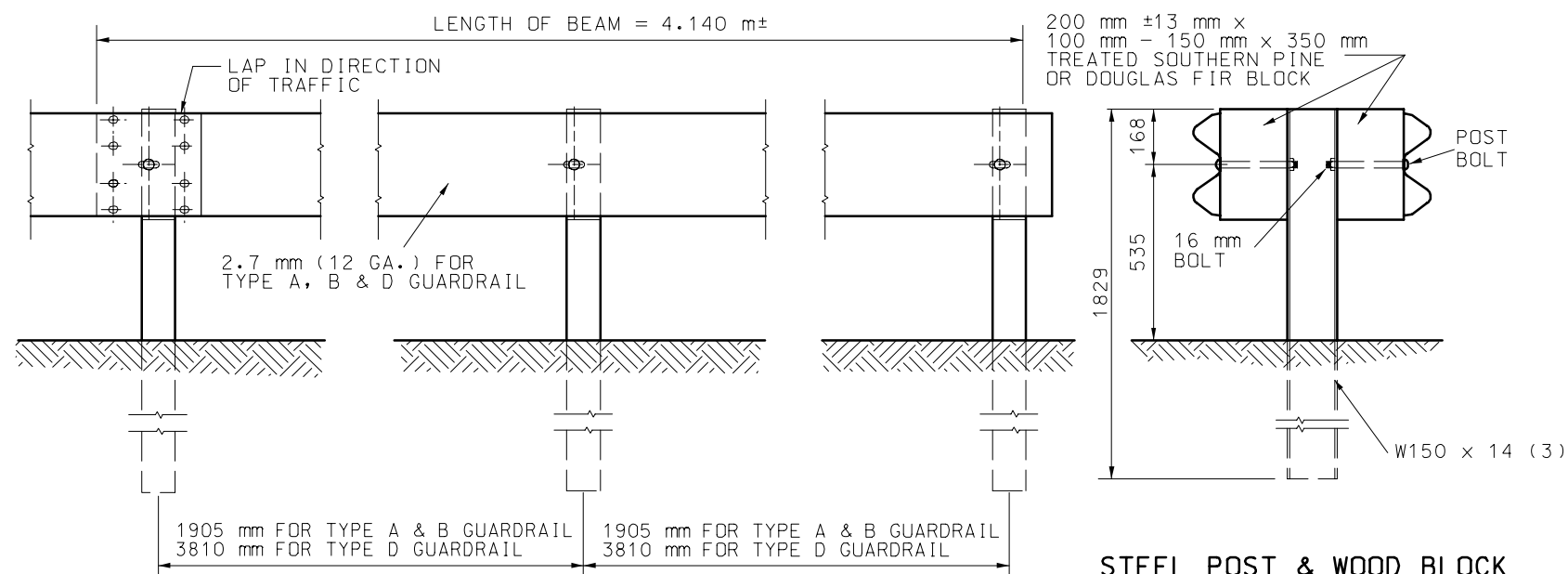
WOOD POST AND
WOOD OR PLASTIC BLOCK STEEL POST AND
WOOD OR PLASTIC BLOCK

TYPE A AND D GUARDRAIL

- (1) END TREATMENT AS SPECIFIED ON PLANS.
- (2) AN ALTERNATE DESIGN, A 200 mm X 100 mm X 350 mm WOOD BLOCK, MAY BE USED.
- (3) THE CONTRACTOR MAY FURNISH EQUIVALENT SECTIONS FABRICATED FROM MATERIAL MEETING AND IN ACCORDANCE WITH SECTION 1040.



PLAN



ELEVATION

STEEL POST & WOOD BLOCK

NOTE:
FOR TYPE E GUARDRAIL AND TRANSITION
DETAILS SEE SHEET 7 OF 15.

TYPE B GUARDRAIL

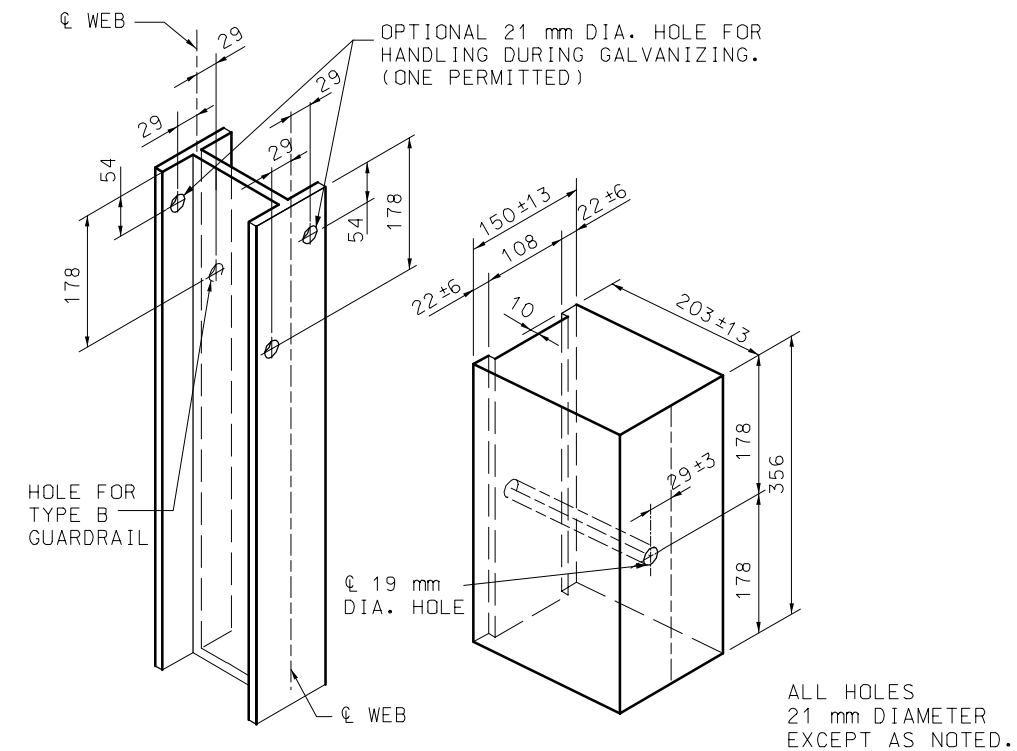
GENERAL NOTES:

ALL DIMENSIONS SHOWN ARE IN mm UNLESS OTHERWISE NOTED.

WASHERS SHALL BE OMITTED ON ALL CONNECTIONS ON TYPE A, B AND D GUARDRAIL.

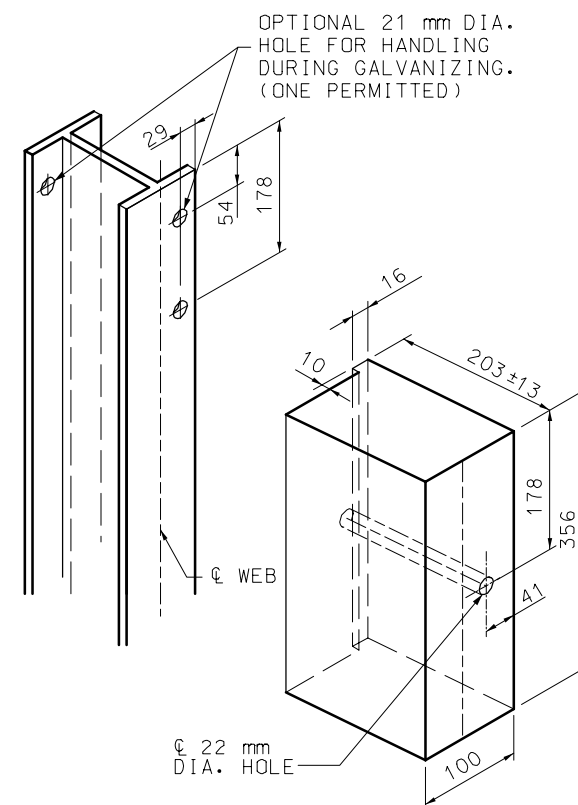
ALL DIMENSIONS ARE SUBJECT TO MANUFACTURING TOLERANCES EXCEPT WHERE ALLOWABLE TOLERANCES ARE SHOWN.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION			
<p style="text-align: center;">GUARDRAIL TYPES A, B & D</p>			
DATE: _____	EFFECTIVE: 01-01-2005	M606.00AR	4 16



**HOLE PUNCHING DETAIL
FOR STEEL POST & WOOD OR PLASTIC BLOCKS (1)**

(1) THE OVERALL NOMINAL DIMENSIONS SHOWN SHALL BE MET, ALTHOUGH THE SHAPE OF THE PLASTIC BLOCKS MAY VARY FROM THE SHAPE SHOWN, EXCEPT THE 22 mm ± 6 mm FLANGE AND THE OVERALL WIDTH DIMENSIONS MAY BE WAIVED IF APPROVED BY PROJECT OPERATIONS.

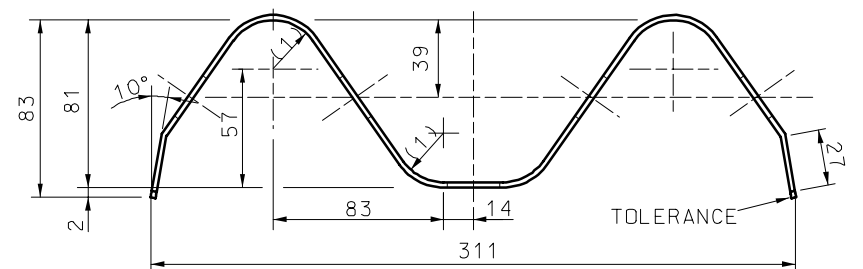
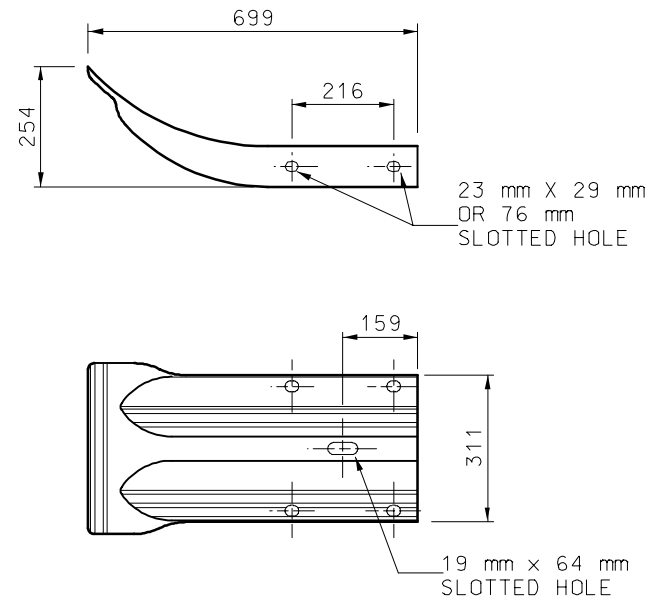
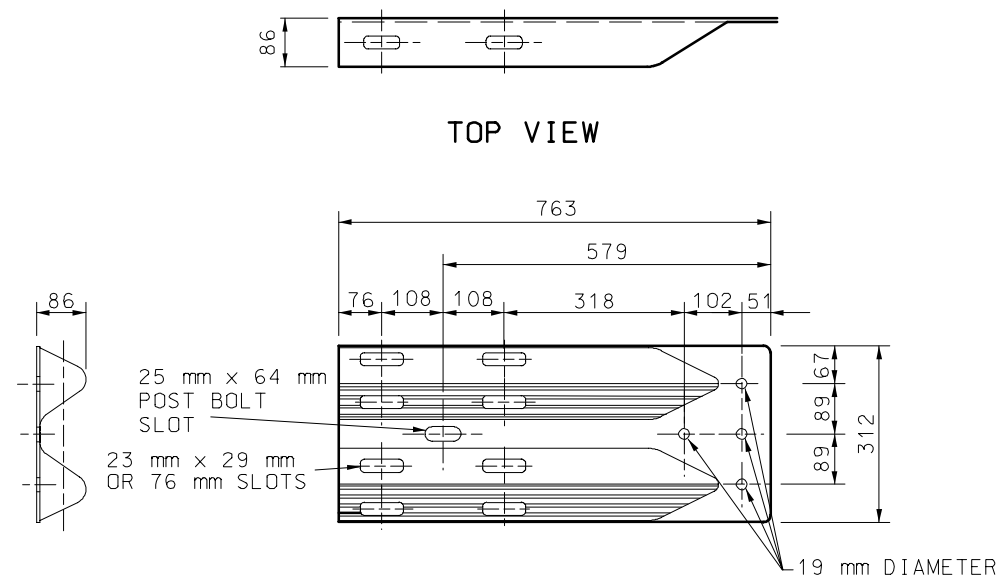


**ALTERNATE DESIGN
FOR WOOD BLOCK**

GENERAL NOTE:

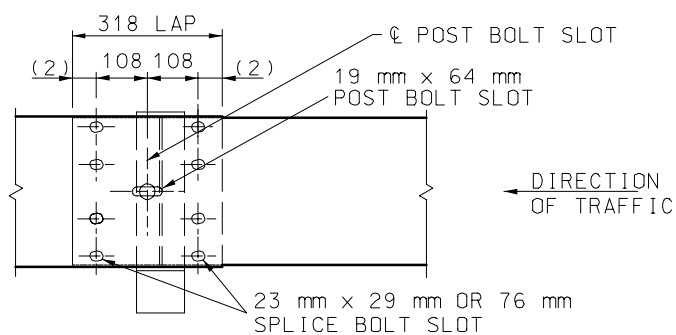
ALL DIMENSIONS SHOWN ARE IN mm UNLESS OTHERWISE NOTED.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION			
GUARDRAIL			
DATE: _____	EFFECTIVE: 01-01-2005	M606.00AR	5/16



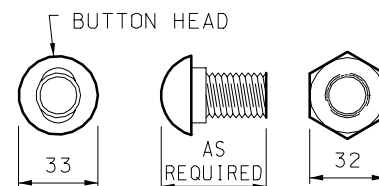
SECTION THRU BEAM

- (1) 24 mm RADIUS
(2) 51 mm (TOLERANCE +32 mm, -6 mm)



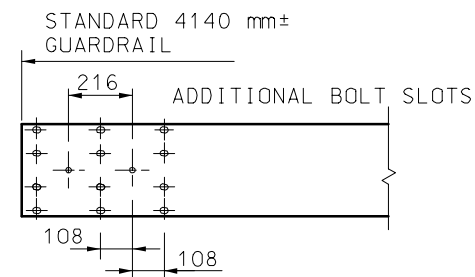
BEAM SPLICE AT POST
TYPE A, B AND D GUARDRAIL

16 mm POST OR SPLICE BOLT

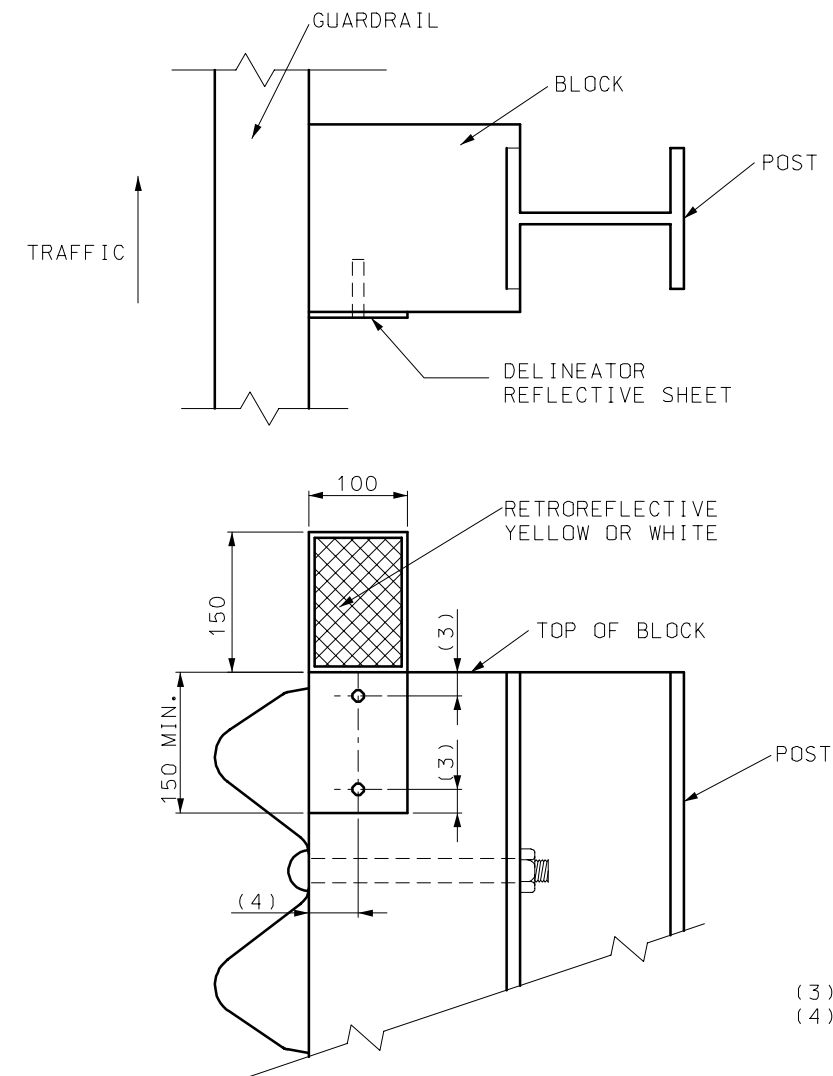


OVAL SHOULDER SHALL BE OF ADEQUATE HEIGHT, LENGTH & SHAPE TO PREVENT TURNING DURING INSTALLATION OR REMOVAL OF BOLT.

NOTE: PORTIONS OF BEAM WITH UNUSED BOLT SLOTS TO BE LAPPED BEHIND.



BEAM DETAILS SHOWING LOCATION OF ADDITIONAL BOLT SLOTS NECESSARY TO OBTAIN GUARDRAIL OFFSET.



- (3) APPROX. 37 mm
(4) APPROX. 50 mm

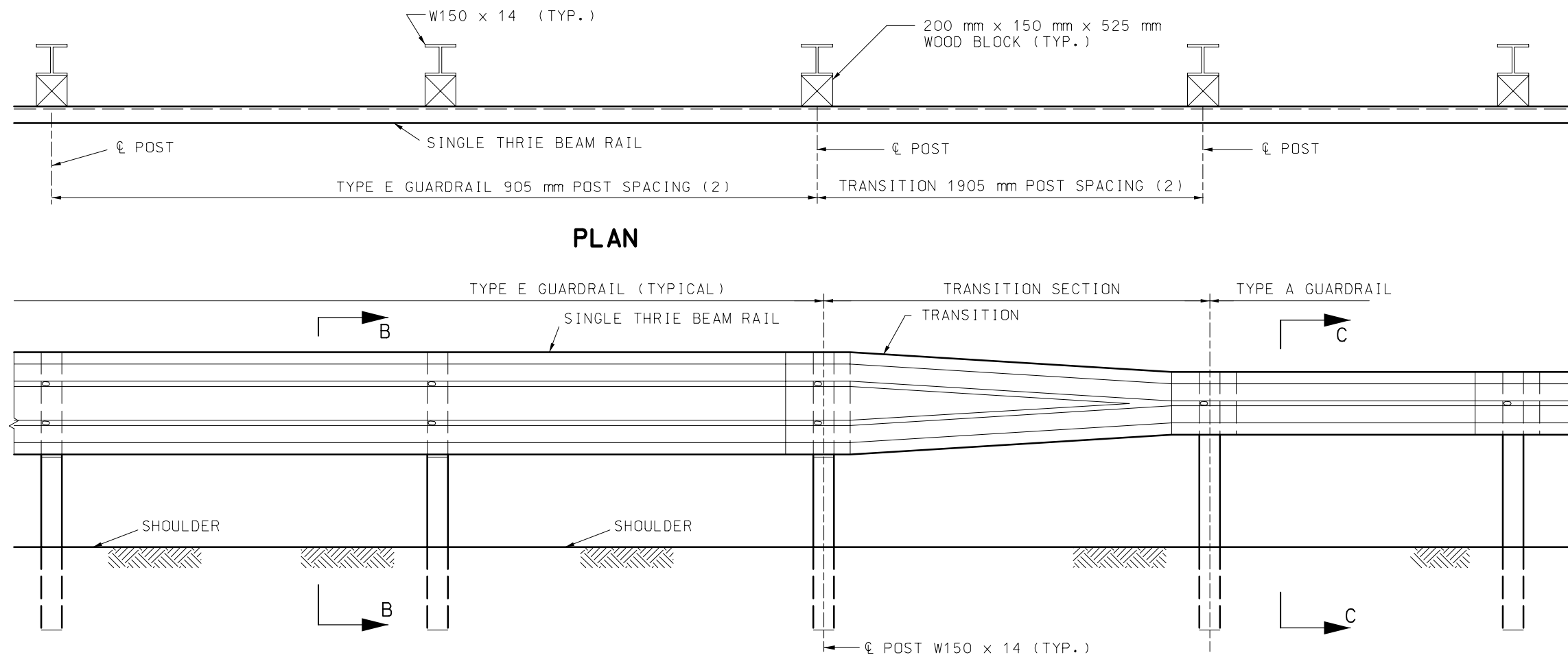
DELINEATORS SHALL BE AFFIXED WITH 50 mm (MIN.) LONG X 6 mm DIAMETER BOLTS OR SCREWS. THE DIAMETER OF THE BOLT'S OR SCREW'S HEAD SHALL BE TWICE THE DIAMETER OF THE HOLE, WITH A MINIMUM OF 12 mm. WASHERS SHALL BE USED WITH THE BOLTS AND SHALL HAVE 12 mm DIAMETER HOLES.

DELINEATORS ON NEW GUARDRAIL

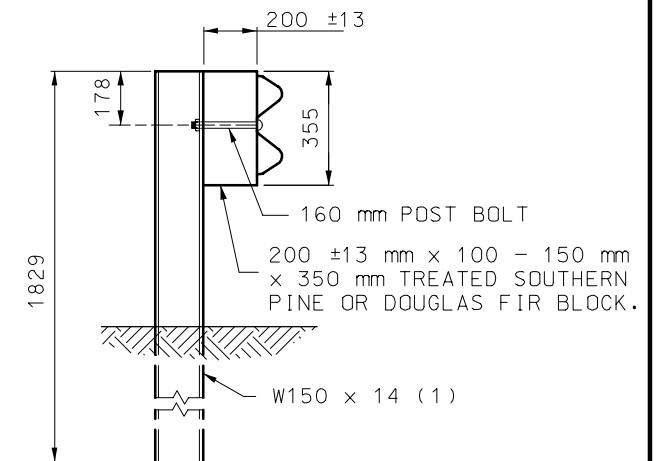
GENERAL NOTE:

ALL DIMENSIONS SHOWN ARE IN mm UNLESS OTHERWISE NOTED.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION			
GUARDRAIL			
DATE: _____	EFFECTIVE: 01-01-2005	M606.00AR	6/16



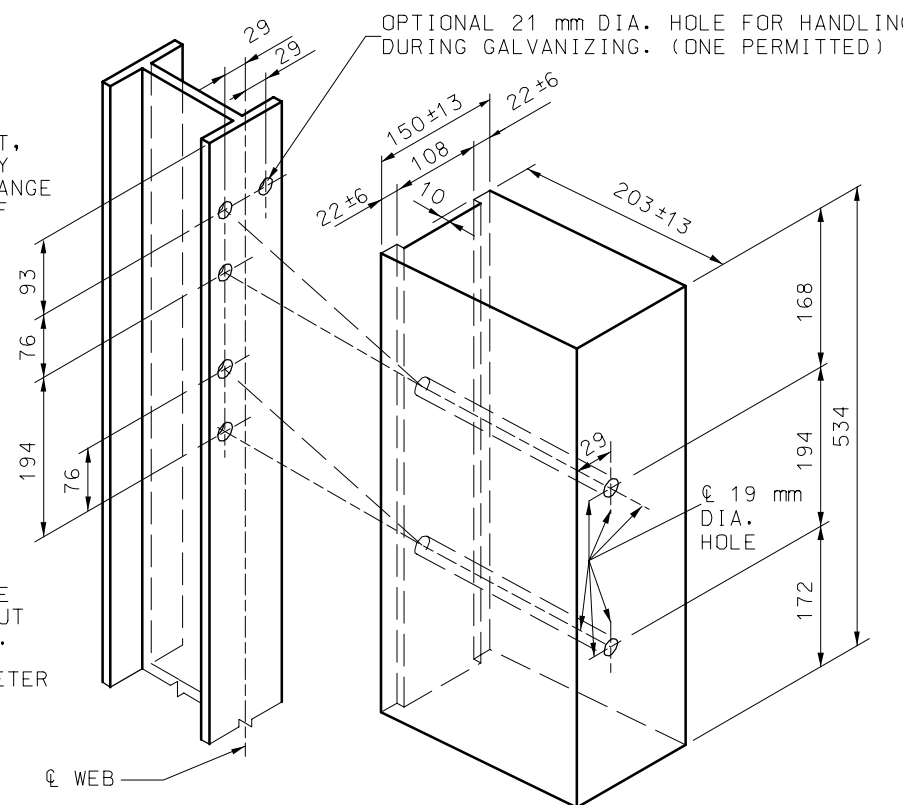
- (1) THE CONTRACTOR MAY FURNISH EQUIVALENT SECTIONS FABRICATED FROM MATERIAL MEETING AND IN ACCORDANCE WITH THE REQUIREMENTS OF ASTM, A769 GRADE 36 (250 MPa) OR 40 (275 MPa).
- (2) IF THE TRANSITION IS CONNECTED TO A BRIDGE ANCHOR SECTION, POST SPACING FOR TYPE E GUARDRAIL AND THE TRANSITION SECTION SHALL BE 952.5 mm. FOR ALL OTHER CASES, POST SPACING SHALL BE 1905 mm.



**SECTION C-C
FOR WOOD BLOCKS**

PART SECTION SHOWING TYPE E TO TYPE A GUARDRAIL TRANSITION

THE OVERALL NOMINAL DIMENSIONS SHOWN SHALL BE MET, ALTHOUGH THE SHAPE OF THE PLASTIC BLOCKS MAY VARY FROM THE SHAPE SHOWN, EXCEPT THE 22 mm ±6 mm FLANGE AND THE OVERALL WIDTH DIMENSIONS MAY BE WAIVED IF APPROVED BY PROJECT OPERATIONS.



**HOLE PUNCHING DETAIL
FOR STEEL POST & WOOD OR PLASTIC BLOCKS**

GENERAL NOTES:

ALL DIMENSIONS ARE SHOWN IN mm UNLESS OTHERWISE NOTED.

TYPE E GUARDRAIL SHALL USE 1905 mm POST SPACING UNLESS 952.5 mm POST IS SPECIFIED.

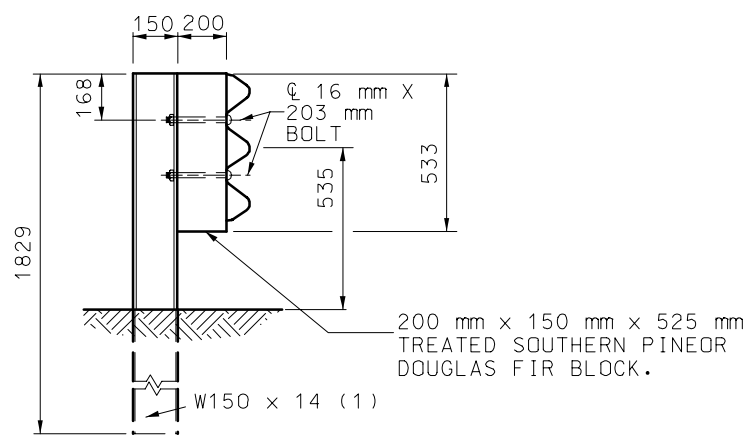
THE THRIE BEAM RAIL FOR THE TYPE E GUARDRAIL AND THE TRANSITION SECTION SHALL BE MADE OF STEEL AND SHALL BE 2.7 mm (12 GA.).

FOR PROTECTIVE COATING AND MATERIAL REQUIREMENTS, SEE SECTION 1040 OF THE STANDARD SPECIFICATIONS.

SEE SHEET 3 OF 14 FOR REQUIREMENTS FOR SETTING POSTS AT OBSTRUCTIONS.

ALL DIMENSIONS ARE SUBJECT TO MANUFACTURING TOLERANCES EXCEPT WHERE ALLOWABLE TOLERANCES ARE SHOWN.

FOR DETAILS NOT SHOWN, SEE OTHER SHEETS OF THIS DRAWING.

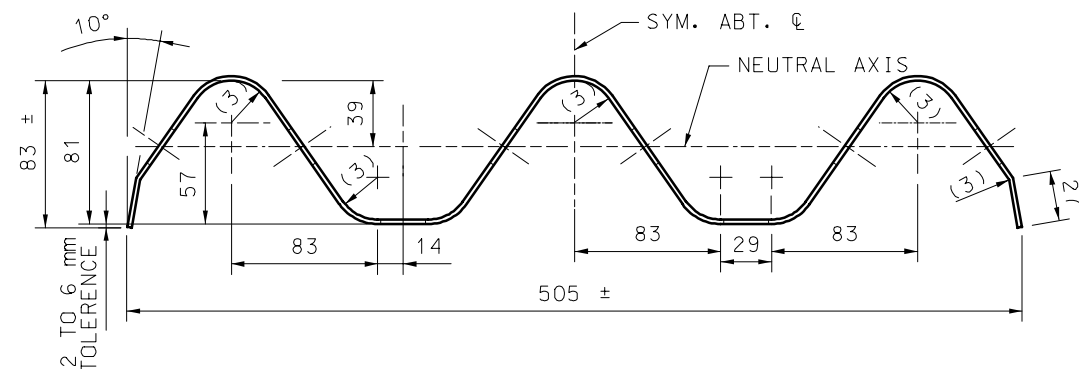


**SECTION B-B
FOR WOOD BLOCKS**

NOTE: BLOCKS SHALL BE THE SAME TYPE THROUGHOUT THE PROJECT LIMITS.

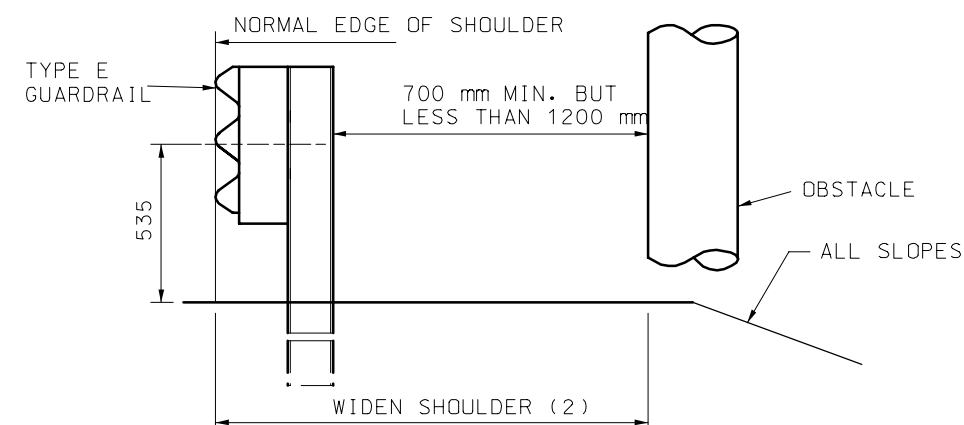
ALL HOLES 21 mm DIAMETER EXCEPT AS NOTED

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION			
GUARDRAIL TYPE E			
DATE: _____	EFFECTIVE: 01-01-2005	M606.00AR	7 16



SECTION THRU THRIE BEAM RAIL

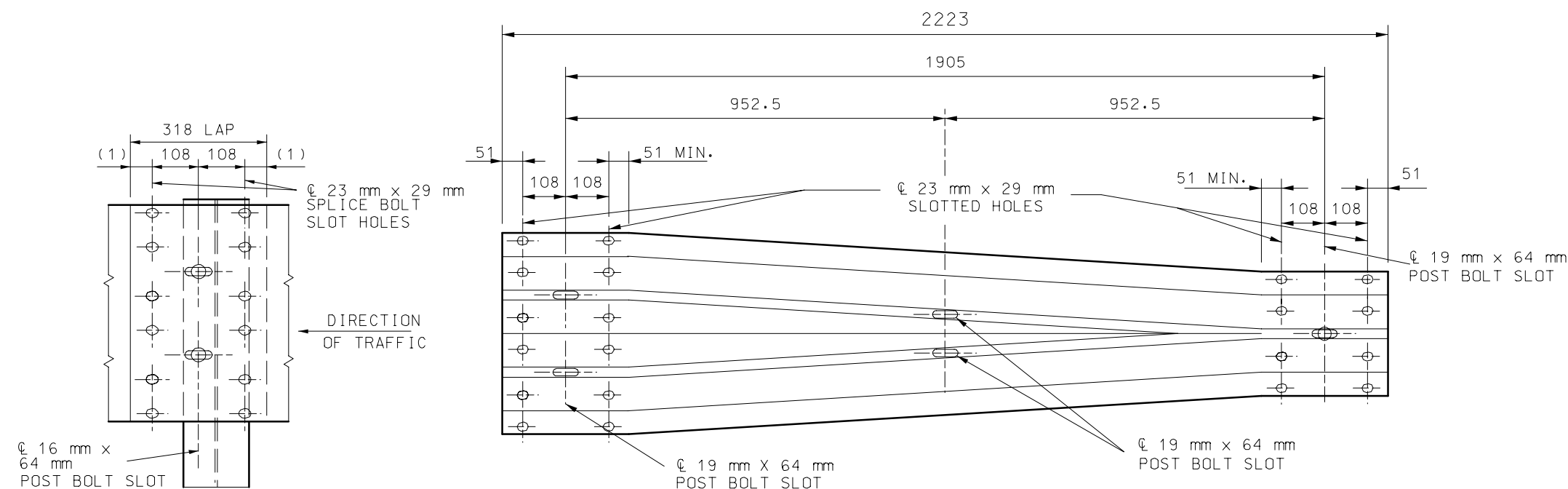
- (1) 50 mm (TOLERANCE +32 mm, -6 mm)
- (2) SHOULDER WIDENING SHALL COMSIST OF EMBANKMENT MATERIAL COMPACTED IN ACCORDANCE WITH SECTION 203.4 STANDAND SPECIFICATION.
- (3) 24 mm RADIUS



SHOULDER ENCOACHMENT WILL BE PERMITTED TO OBTAIN MINIMUM CLEARANCE AT EXISTING OBSTACLES. A 1:50 TAPER SHALL BE USED FROM THE NORMAL SHOULDER LINE LOCATION TO THE ENCROACHMENT LOCATION AND, IF GUARDRAIL IS CONTINOUS, BACK TO THE LOCATION.

USE 7620 mm OF TYPE E GUARDRAIL PRECEDING THE OBSTACLE, AND THROUGH THE LIMITS OF THE OBSTACLE WHEN THE ABOVE CONDITION EXISTS.

LATERAL PLACEMENT OF TYPE E GUARDRAIL



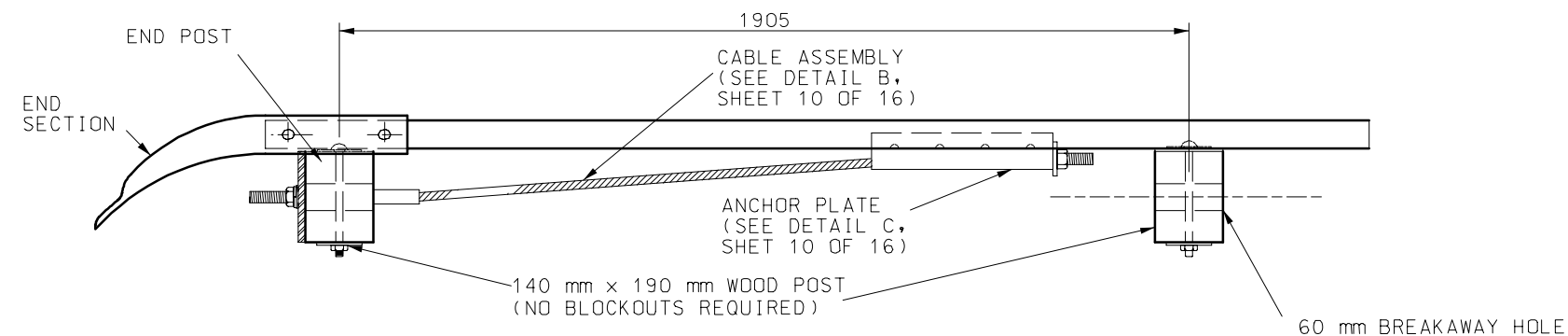
THRIE BEAM RAIL SPLICE AT POST

ELEVATION OF TRANSITION SECTION

GENERAL NOTE:

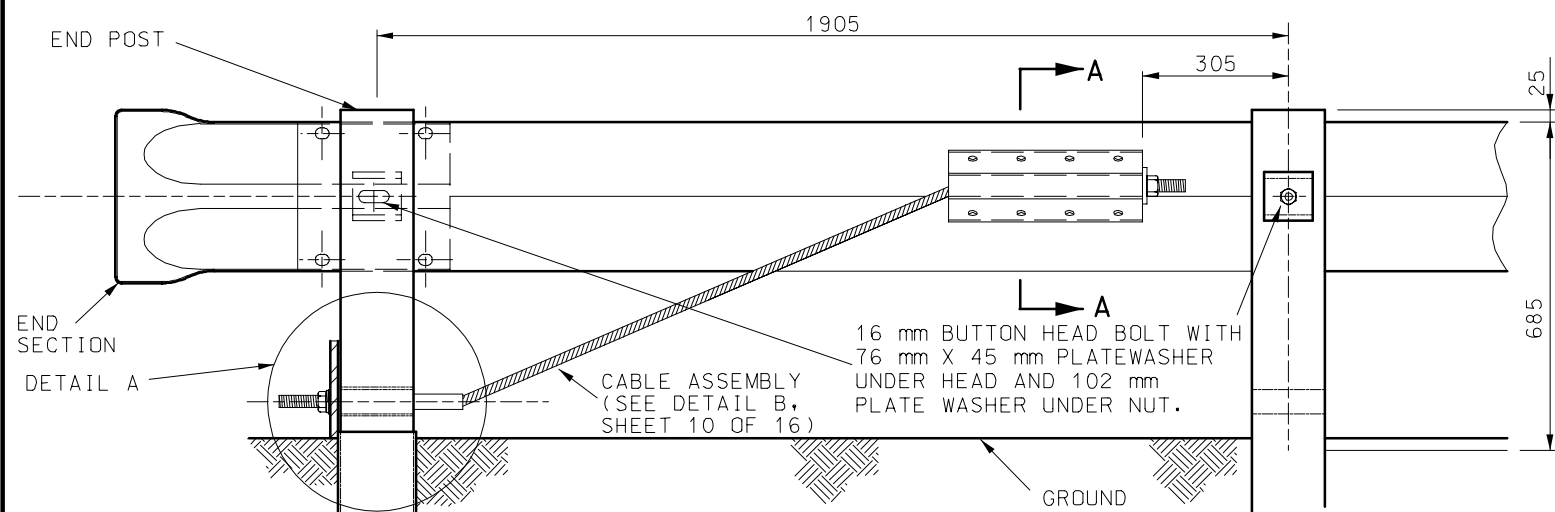
ALL DIMENSIONS SHOWN ARE IN mm UNLESS OTHERWISE NOTED.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION			
GUARDRAIL TYPE E			
DATE: _____	EFFECTIVE: 01-01-2005	M606.00AR	8
			16



NOTE: SEE SHEET 6 OF 16 FOR
DETAILS OF END SECTION.

PLAN



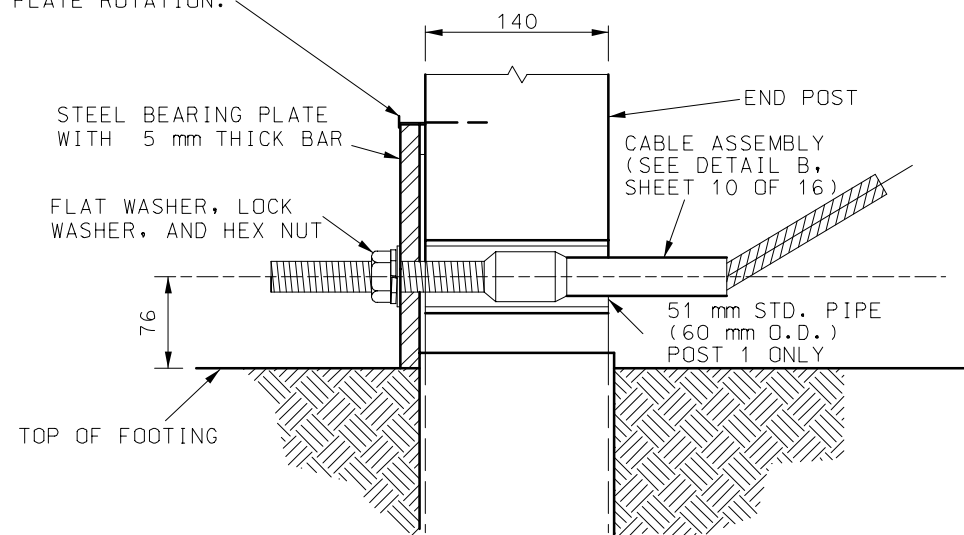
POST 1

ELEVATION
(BACK SIDE)

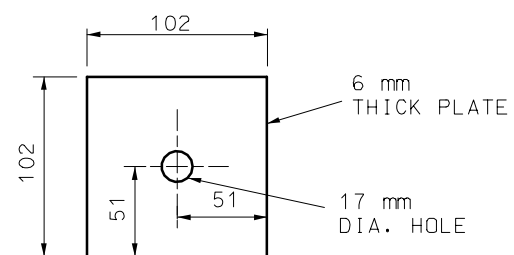
POST 2

END ANCHOR DETAILS

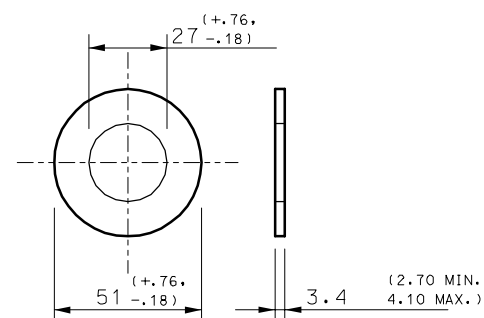
TWO 8D (64 mm LONG
X 3.3 mm DIA. WIRE)
GALV. NAILS TO PREVENT
PLATE ROTATION.



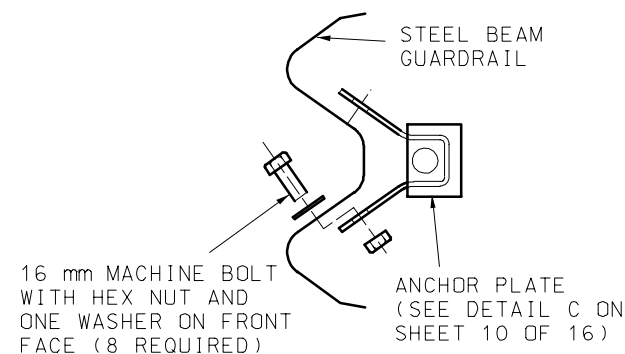
DETAIL A
(END POST DETAIL)



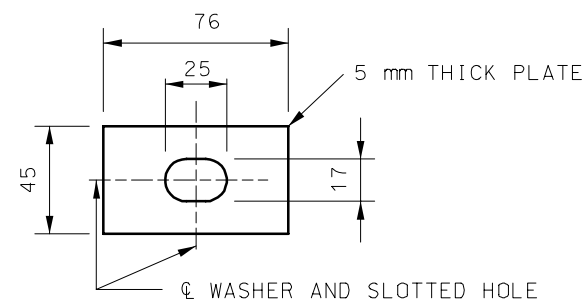
102 mm PLATE WASHER



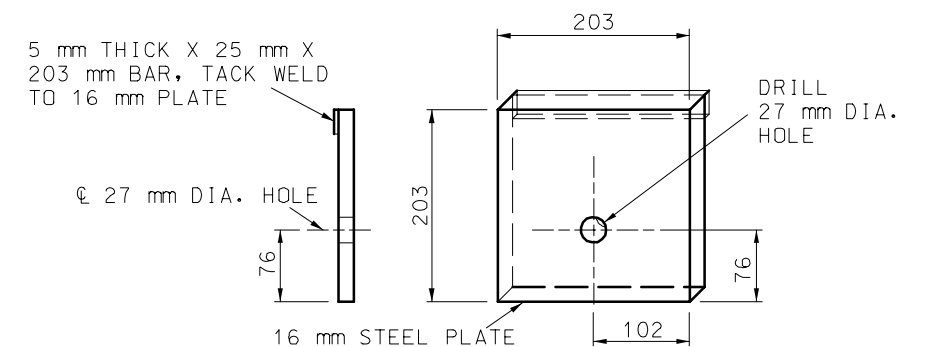
TYPE A WASHER



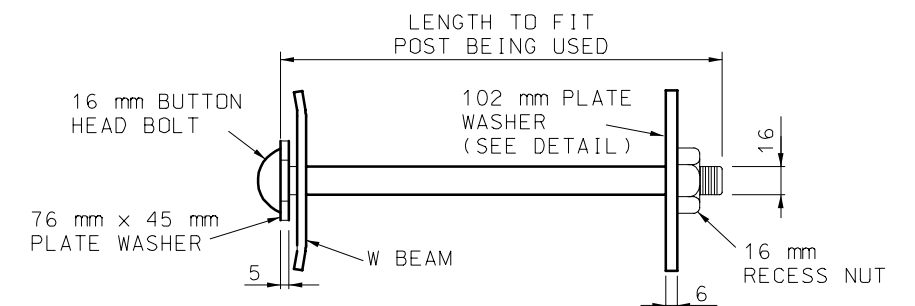
SECTION A-A



76 mm x 45 mm
PLATE WASHER



DETAIL OF
STEEL BEARING PLATE



POST BOLT ASSEMBLY

GENERAL NOTES:

ALL DIMENSIONS SHOWN ARE IN mm UNLESS OTHERWISE NOTED.

END ANCHOR DETAILS SHOWN SHALL BE USED ONLY ON DOWN STREAM ENDS OF GUARDRAIL WHEN AN END ANCHOR IS REQUIRED.

THE DETAILS SHOWN ARE FOR AN END ANCHORAGE SYSTEM FOR GUARDRAIL. GUARDRAIL AND POSTS ARE PAID FOR SEPARATELY.

CABLE ASSEMBLY AND ANCHOR PLATE SHALL BE SUBJECT TO APPROVAL BY THE ENGINEER AND SHALL HAVE A MINIMUM BREAKING STRENGTH OF 178 Kn.

ALL FITTINGS AND HARDWARE REQUIRED SHALL BE GALVANIZED AFTER FABRICATION, SEE SECTION 1040 STANDARD SPECIFICATION.

WOOD POSTS 1 AND 2 SHALL BE 140 mm X 190 mm.

SEE SECTION 1050 STANDARD SPECIFICATIONS FOR WOOD POST.

MISSOURI HIGHWAYS AND TRANSPORTATION
COMMISSION

GUARDRAIL END ANCHOR DETAILS

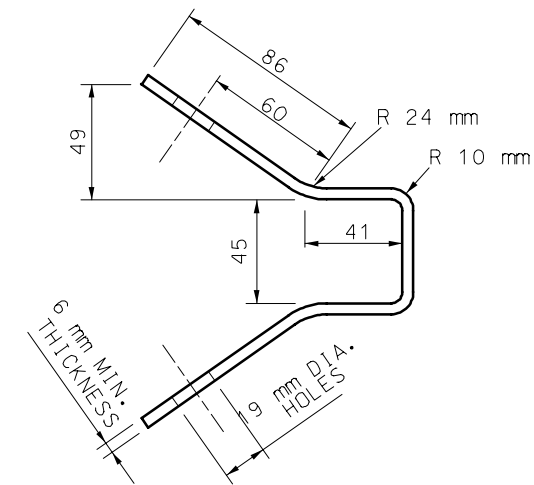
DATE: _____

EFFECTIVE: 01-01-2005

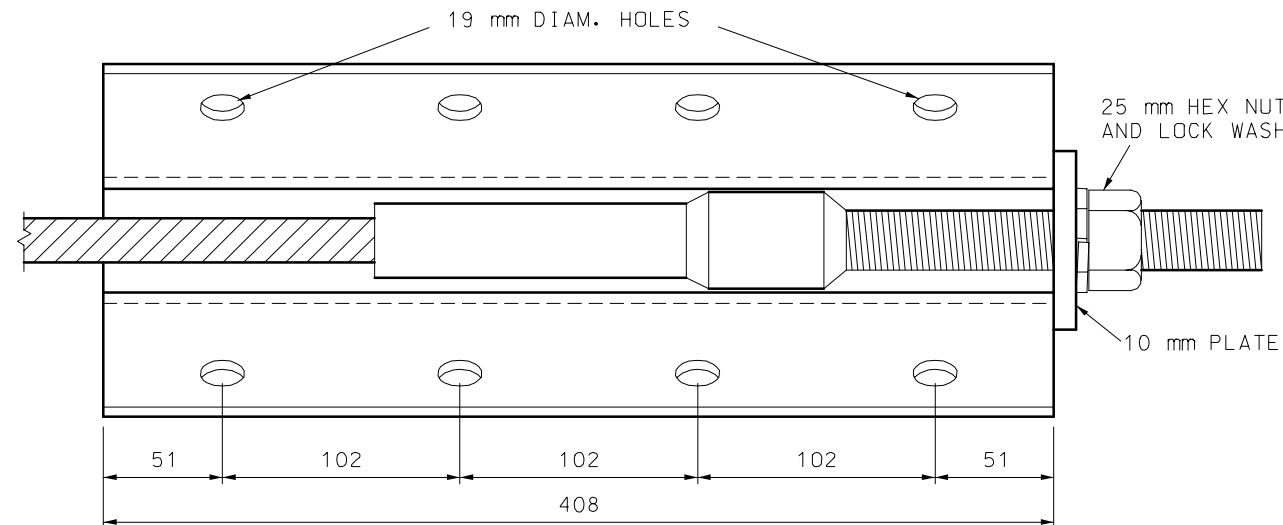
M606.00AR

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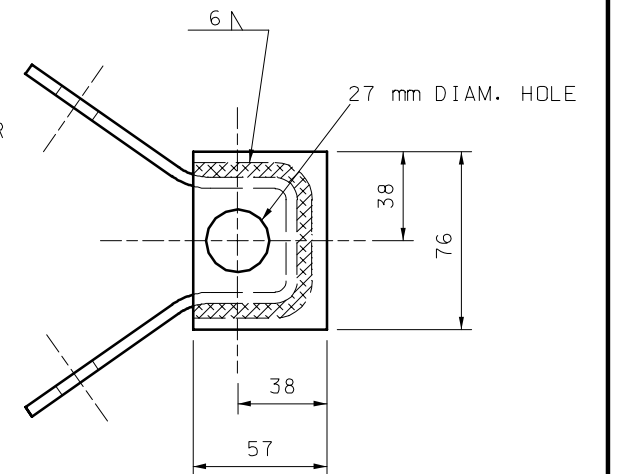
16



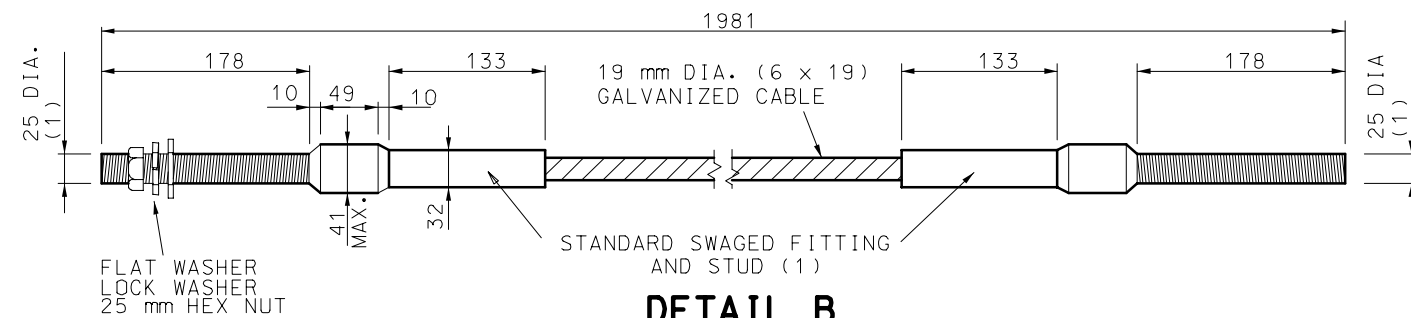
FABRICATION DETAIL



**DETAIL C
ASSEMBLED VIEW
(ANCHOR PLATE)**

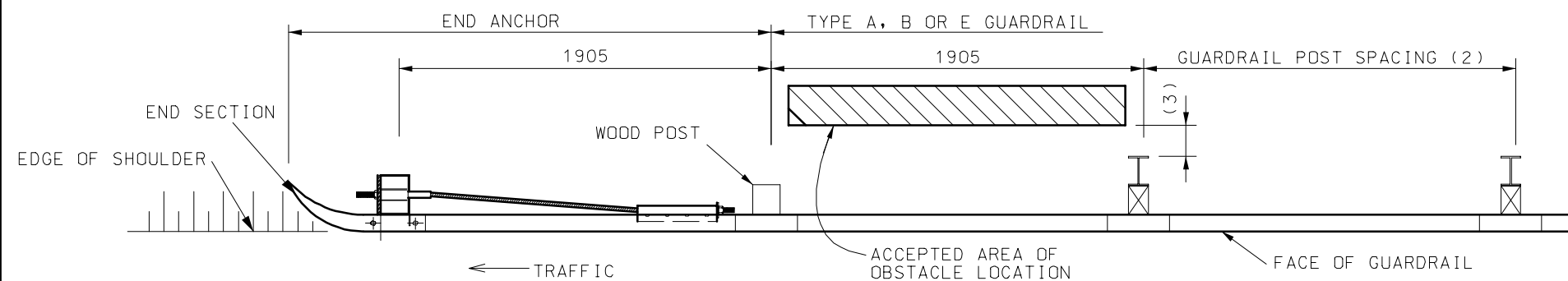


END VIEW

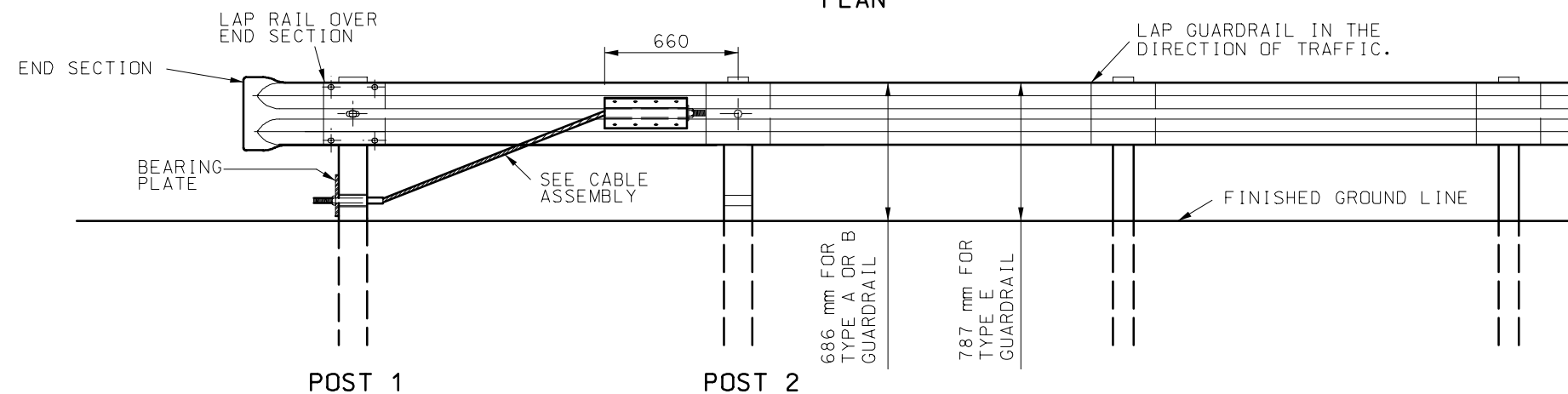


**DETAIL B
(CABLE ASSEMBLY)**

- (1) STUD, THREADED ENTIRE LENGTH.
 (2) 1905 mm SPACING FOR TYPE A OR B GUARDRAIL; 952.5 mm SPACING FOR TYPE E GUARDRAIL.
 (3) 675 mm MINIMUM BUT LESS THAN 1200 mm FOR TYPE E GUARDRAIL; 1200 mm MINIMUM FOR TYPE A GUARDRAIL.



PLAN

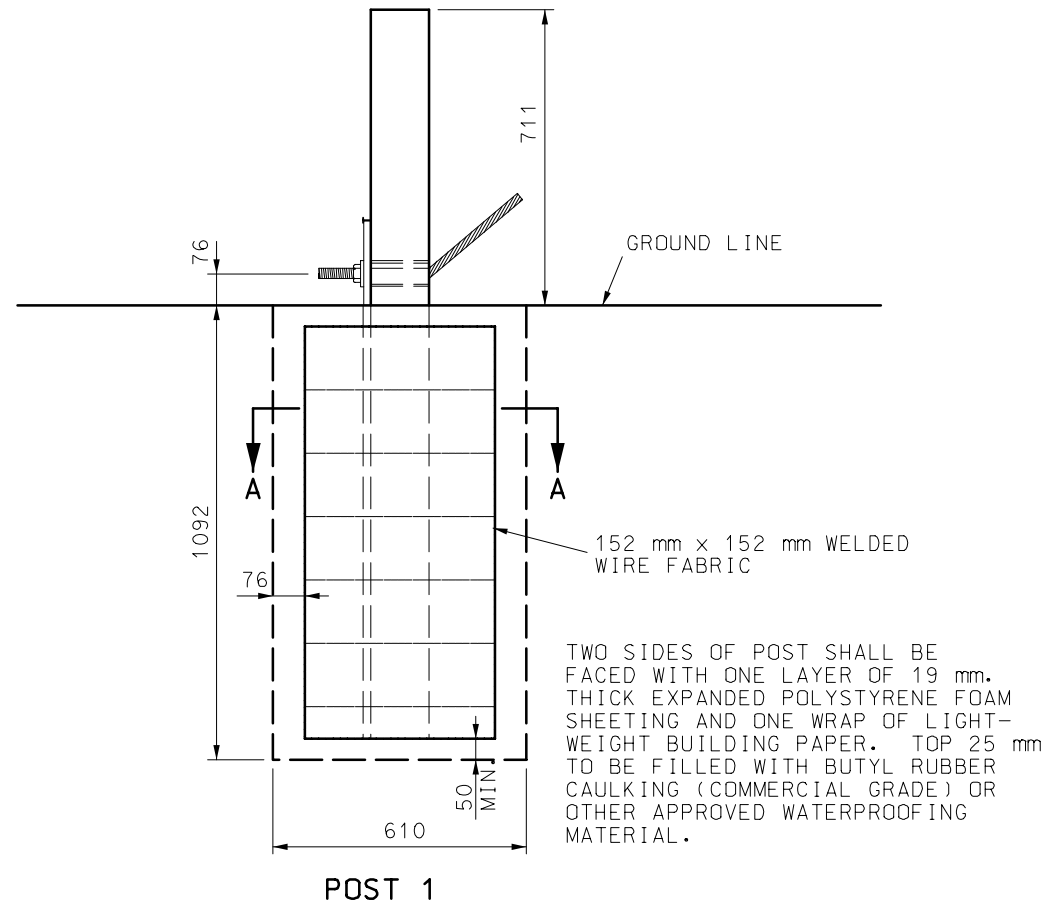


**ELEVATION
END ANCHOR**

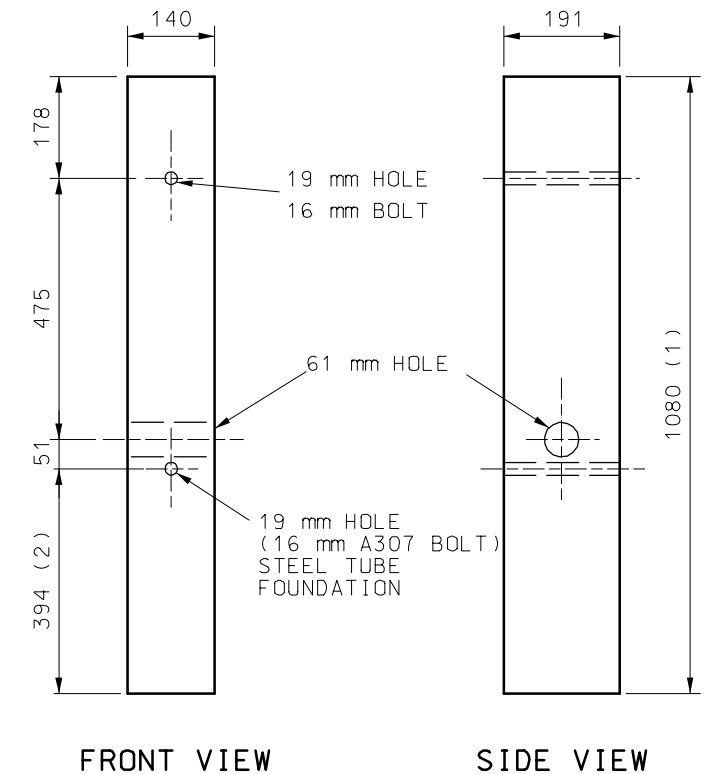
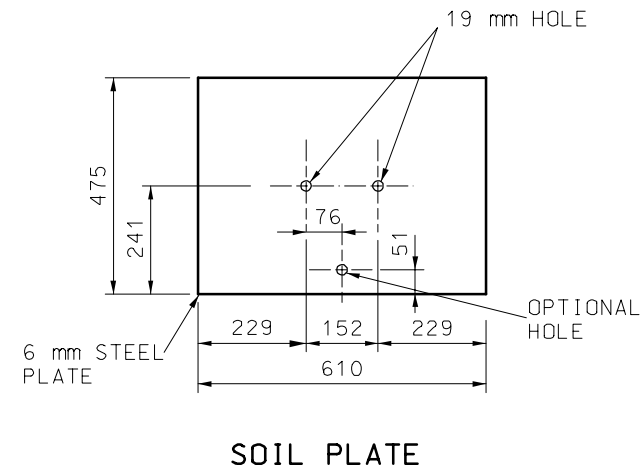
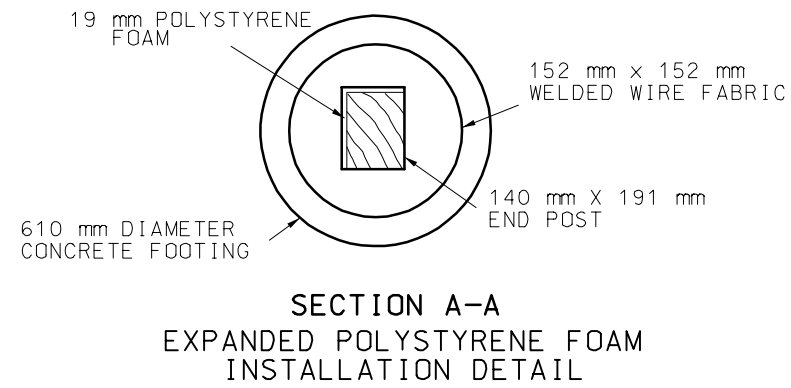
GENERAL NOTE:

ALL DIMENSIONS SHOWN ARE IN mm UNLESS OTHERWISE NOTED.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION			
GUARDRAIL END ANCHOR DETAILS			
DATE: _____	EFFECTIVE: 01-01-2005	M606.00AR	10/16

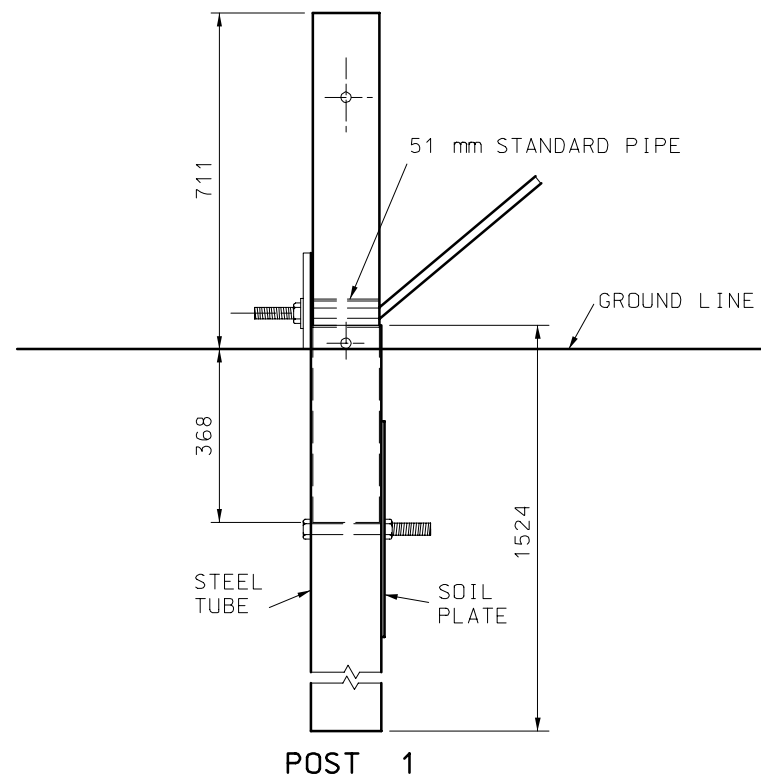


CONCRETE FOUNDATION FOR END ANCHORS



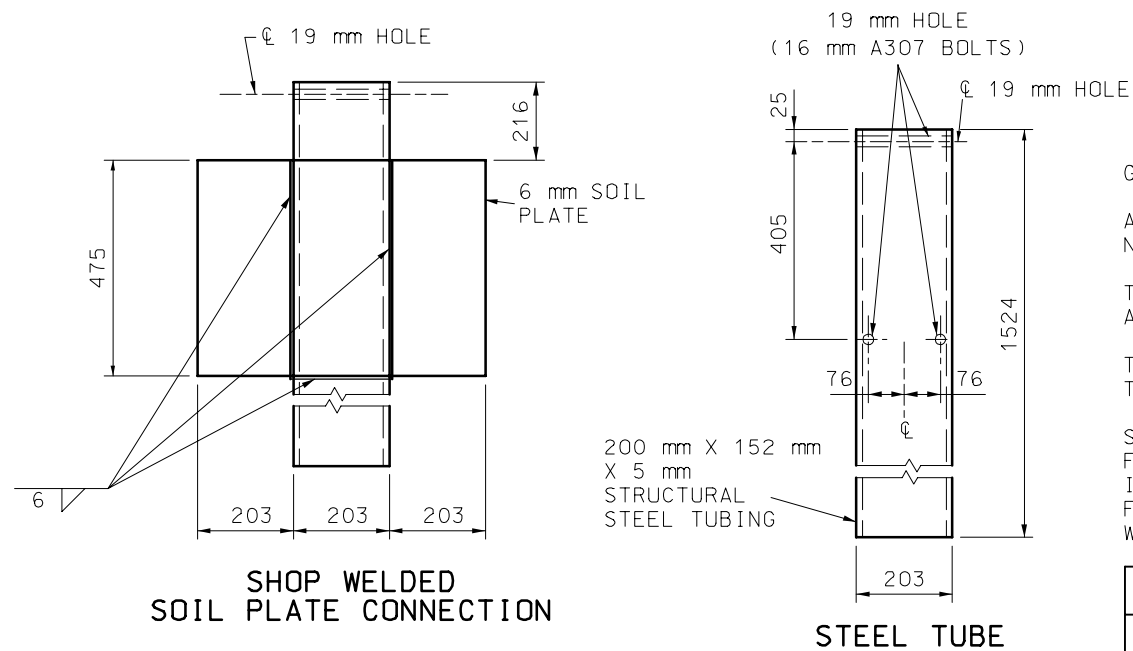
WOOD BREAKAWAY POST
SEE SECTION 1050

- (1) 1765 mm FOR CONCRETE
FOUNDATION ALTERNATE.
(2) 1080 mm FOR CONCRETE
FOUNDATION ALTERNATE.



STEEL TUBE FOUNDATION FOR END ANCHORS

BOLTS AND NUTS SHALL BE GALVANIZED IN ACCORDANCE WITH THE REQUIREMENTS OF AASHTO M232, OR THEY MAY BE MECHANICALLY GALVANIZED IN ACCORDANCE WITH AASHTO M232 CLASS C.



GENERAL NOTES:

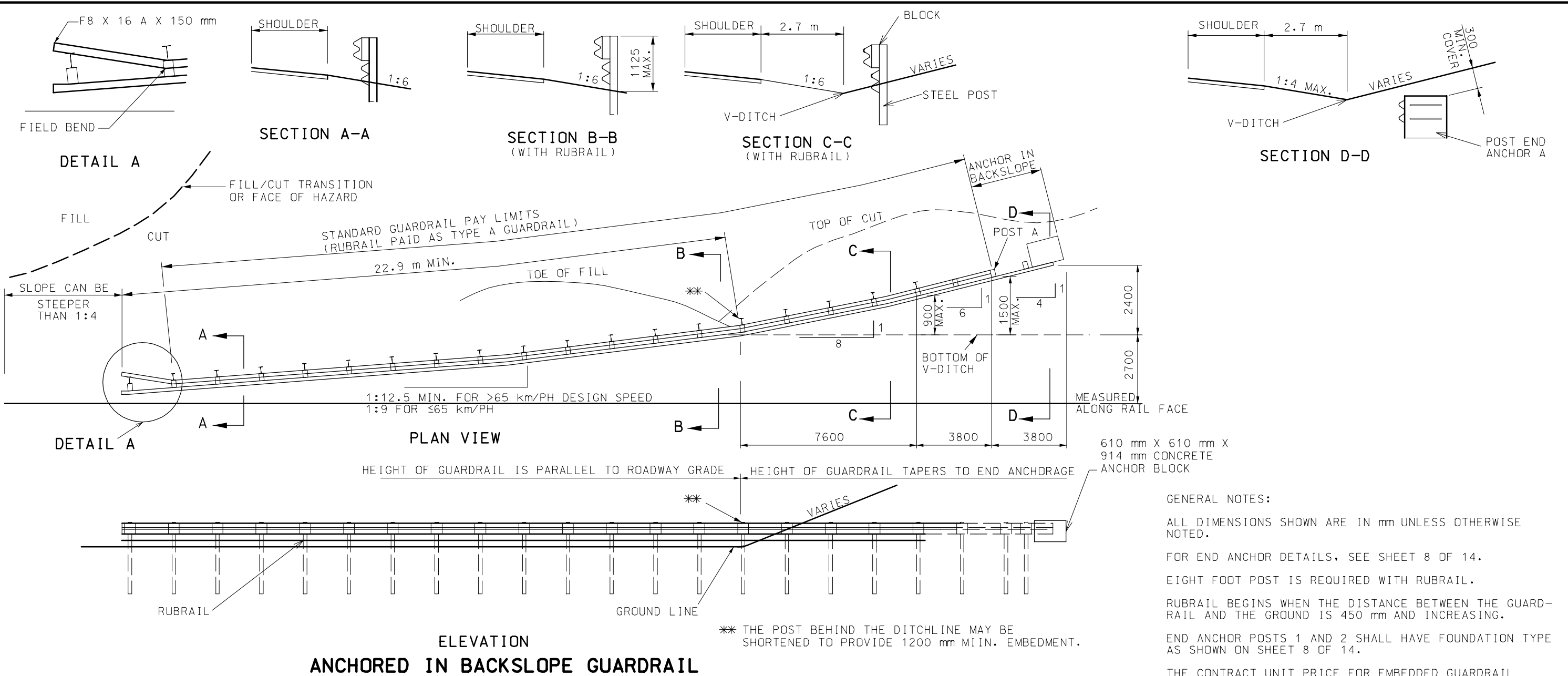
ALL DIMENSIONS SHOWN ARE IN mm UNLESS OTHERWISE NOTED.

THE CONTRACTOR HAS THE OPTION TO INSTALL WOOD POST 1 AND 2 IN STEEL TUBE OR CONCRETE FOUNDATION.

TRIMMING OF WOOD POST MAY BE NECESSARY FOR STEEL TUBE FOUNDATION.

STEEL TUBE FOUNDATIONS SHALL BE DRILLED AND BACK-FILLED WITH A SUITABLE MATERIAL WHEN THE SOIL PLATE IS BOLTED, AS SHOWN, TO THE STEEL TUBE. STEEL TUBE FOUNDATION MAY BE DRIVEN WHEN THE SOIL PLATE IS WELDED, AS SHOWN, TO THE STEEL TUBE.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION			
GUARDRAIL			
DATE: _____	EFFECTIVE: 01-01-2005	M606.00AR	11/16



GENERAL NOTES:

ALL DIMENSIONS SHOWN ARE IN mm UNLESS OTHERWISE NOTED.

FOR END ANCHOR DETAILS, SEE SHEET 8 OF 14.

EIGHT FOOT POST IS REQUIRED WITH RUBRAIL.

RUBRAIL BEGINS WHEN THE DISTANCE BETWEEN THE GUARDRAIL AND THE GROUND IS 450 mm AND INCREASING.

END ANCHOR POSTS 1 AND 2 SHALL HAVE FOUNDATION TYPE AS SHOWN ON SHEET 8 OF 14.

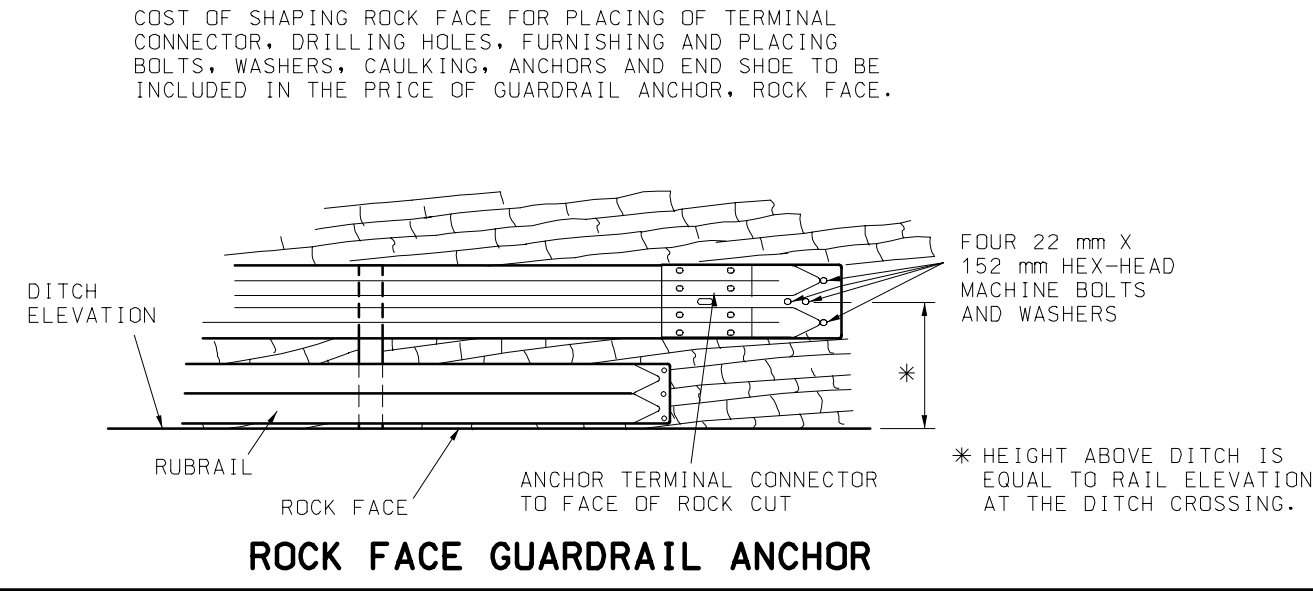
THE CONTRACT UNIT PRICE FOR EMBEDDED GUARDRAIL ANCHOR SHALL INCLUDE THE CONCRETE ANCHOR, EXCAVATION AND BACKFILLING, OR TERMINAL CONNECTOR, AND ALL INCIDENTAL HARDWARE AND WORK NECESSARY TO COMPLETE THE INSTALLATION.

THE GUARDRAIL SHALL EXTEND 15.2 m± BEYOND THE DITCH LINE AND TERMINATE A MINIMUM OF 300 mm BELOW GROUND ELEVATION OF THE BACKSLOPE.

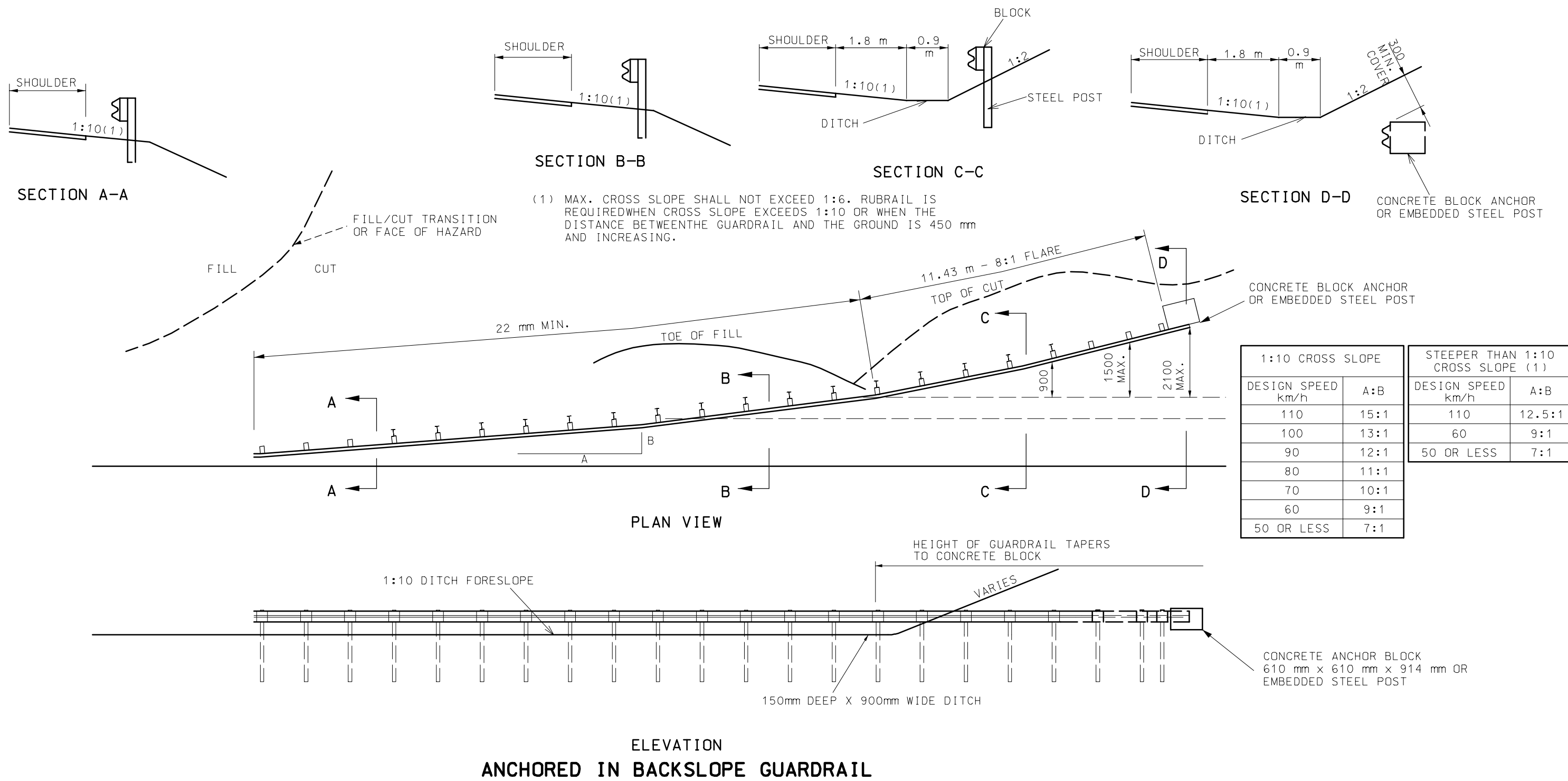
BLOCKOUTS WILL NOT BE REQUIRED FOR ANY POST WHICH WILL BE COMPLETELY BELOW GROUND. THE ALIGNMENT OF SUCH POSTS SHALL BE APPROVED BY THE ENGINEER.

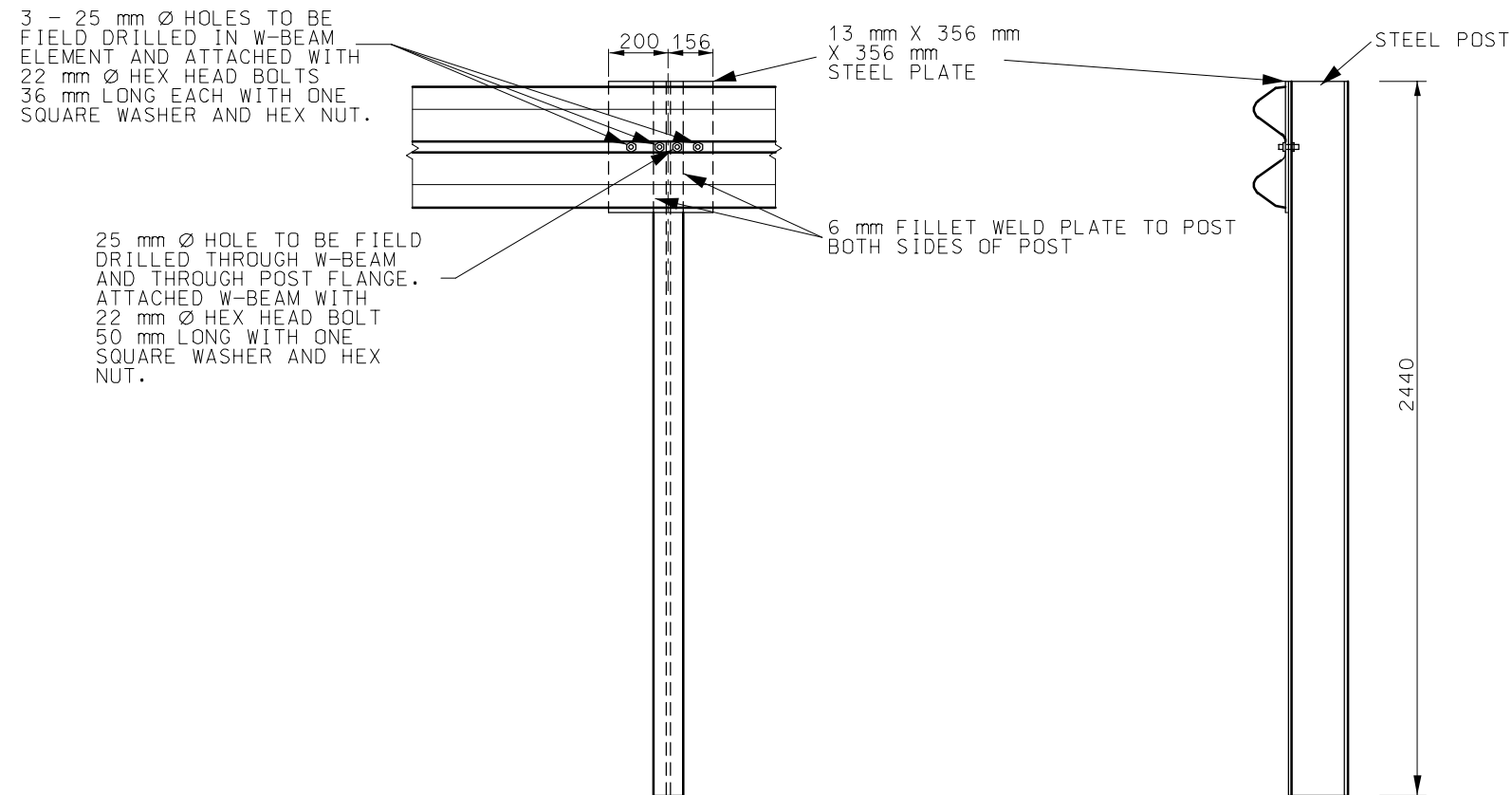
SEE OTHER DRAWINGS AND STANDARD SPECIFICATIONS FOR MATERIAL AND CONSTRUCTION REQUIREMENTS NOT SHOWN.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION			
GUARDRAIL ANCHOR IN BACKSLOPE WITH V-DITCH STEEPER THAN 1:10, 1:4 MAX. FORESLOPE			
DATE: _____	EFFECTIVE: 01-01-2005	M606.00AR	12/16

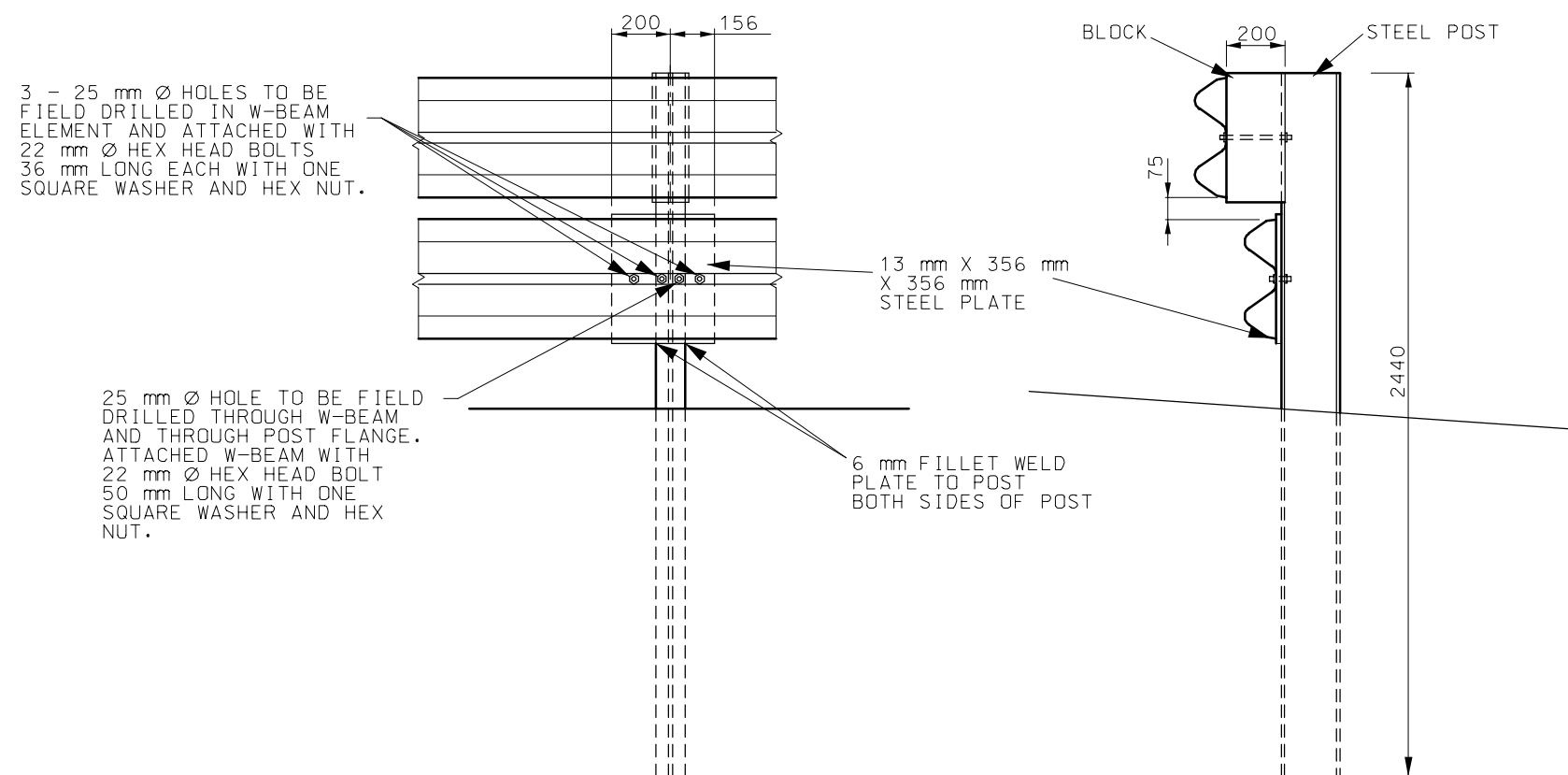


COST OF SHAPING ROCK FACE FOR PLACING OF TERMINAL CONNECTOR, DRILLING HOLES, FURNISHING AND PLACING BOLTS, WASHERS, CAULKING, ANCHORS AND END SHOE TO BE INCLUDED IN THE PRICE OF GUARDRAIL ANCHOR, ROCK FACE.





EMBEDDED STEEL POST



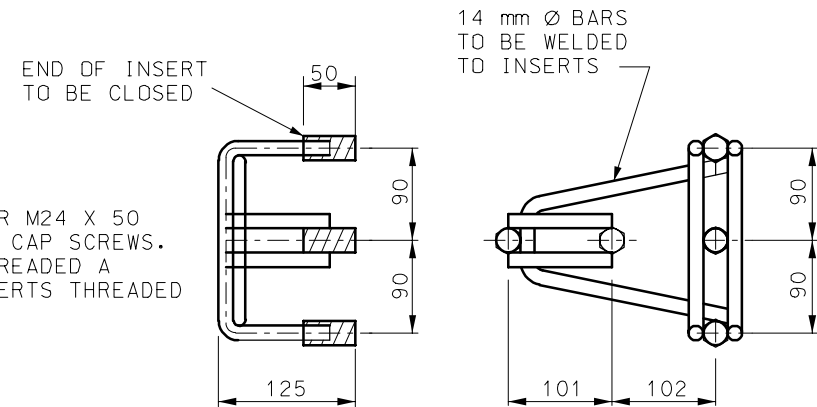
SPECIAL RUBRAIL TO POST CONNECTION AT POST A

GENERAL NOTE:

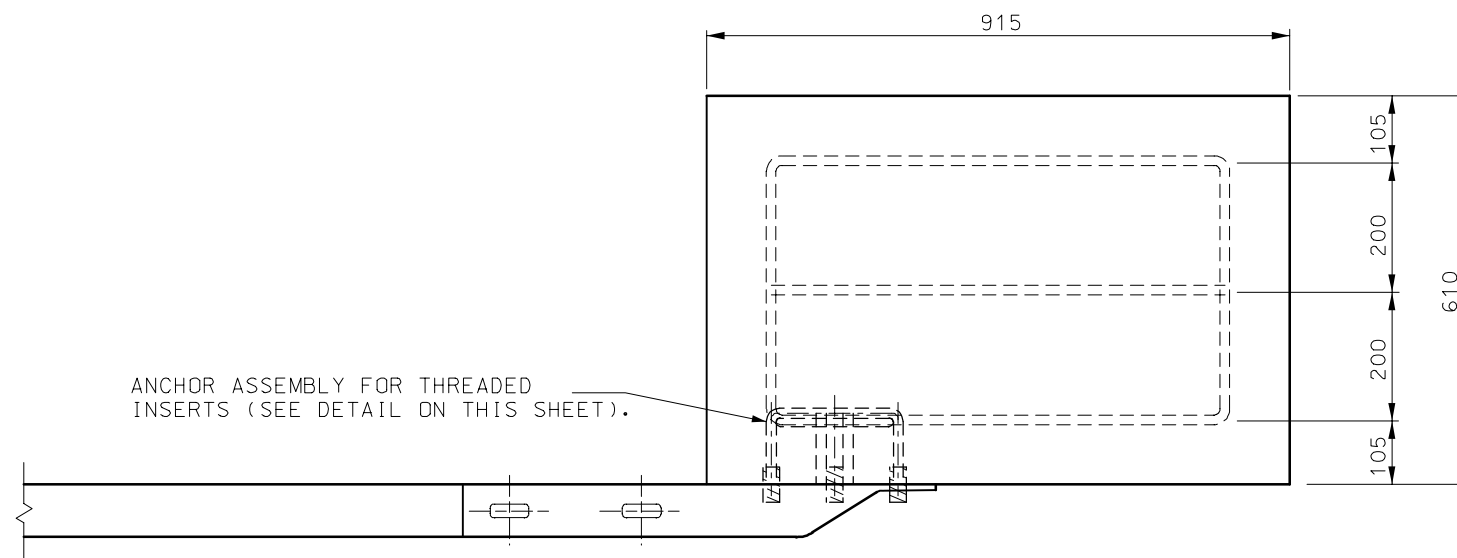
ALL DIMENSIONS SHOWN ARE IN mm UNLESS OTHERWISE NOTED.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION			
		GUARDRAIL ANCHORED IN BACKSLOPE END ANCHORAGE DETAILS EMBEDDED STEEL POST OPTION	
DATE: _____	EFFECTIVE: 01-01-2005	M606.00AR	14 16

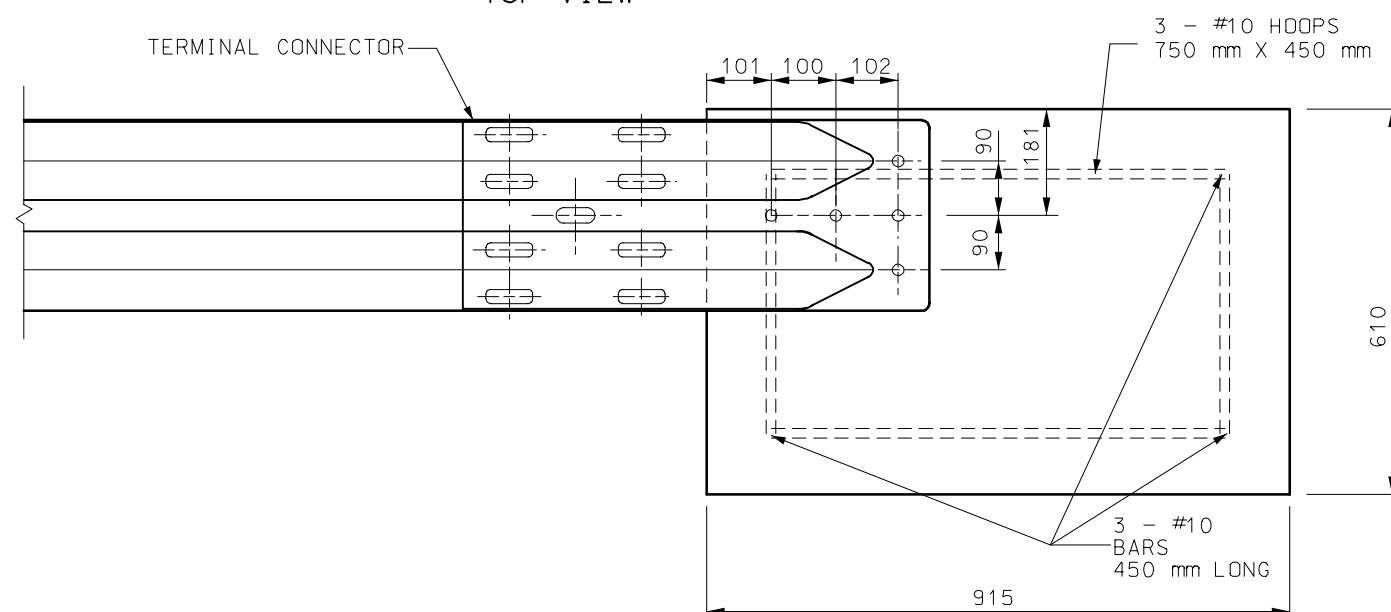
THREADED INSERTS FOR M24 X 50 GALVANIZED HEX HEAD CAP SCREWS. CAP SCREWS TO BE THREADED A MINIMUM 48 mm. INSERTS THREADED MINIMUM OF 45 mm.



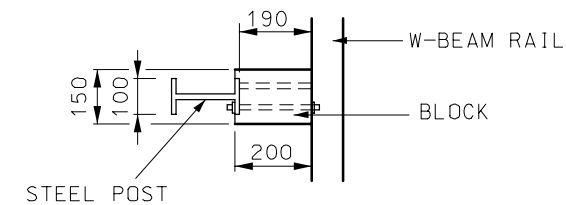
**CONCRETE BLOCK ANCHOR
ANCHOR ASSEMBLY**



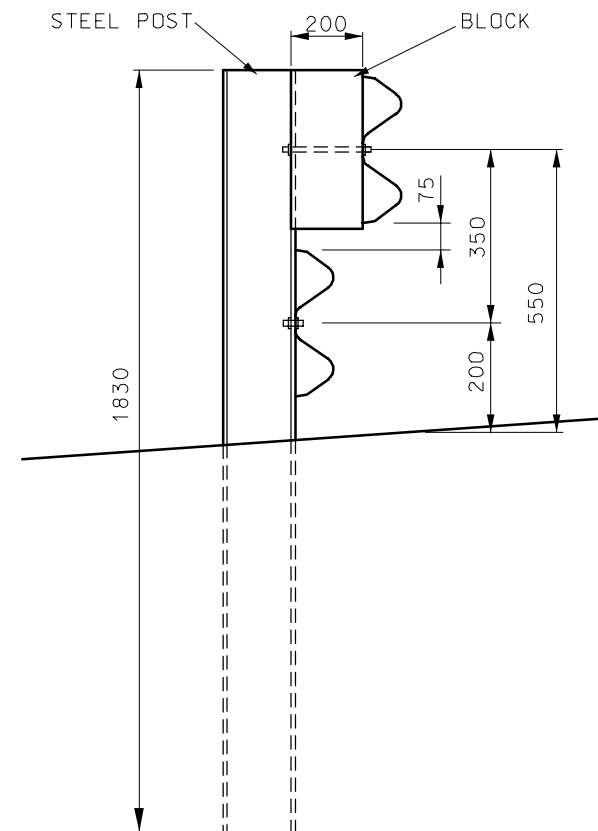
TOP VIEW



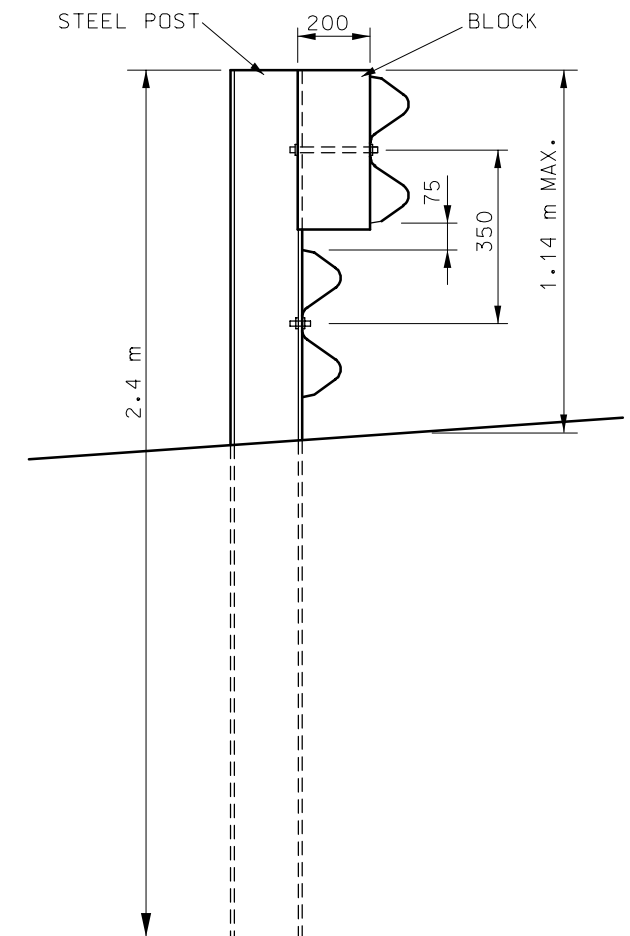
**ELEVATION
CONCRETE BLOCK ANCHOR
(610 mm X 610 mm X 915 mm)**



PLAN

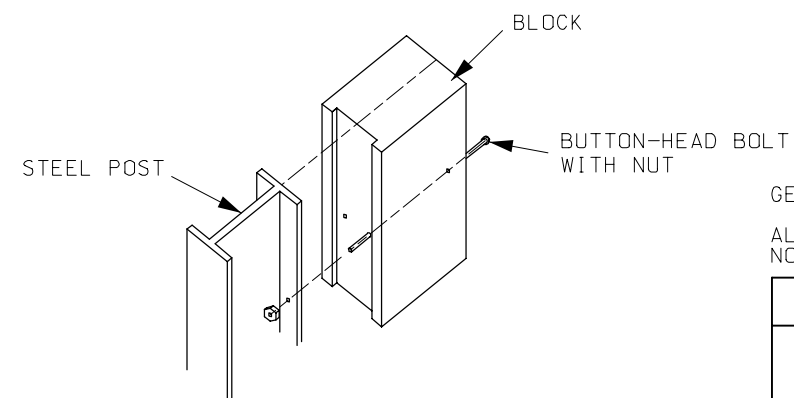


ELEVATION OF 1.8 m POST



ELEVATION 2.4 m POST

STEEL POST AND BLOCK DETAIL



EXPLODED VIEW

(RAIL AND WASHER NOT SHOWN)

GENERAL NOTE:

ALL DIMENSIONS SHOWN ARE IN mm UNLESS OTHERWISE NOTED.

MISSOURI HIGHWAYS AND TRANSPORTATION
COMMISSION

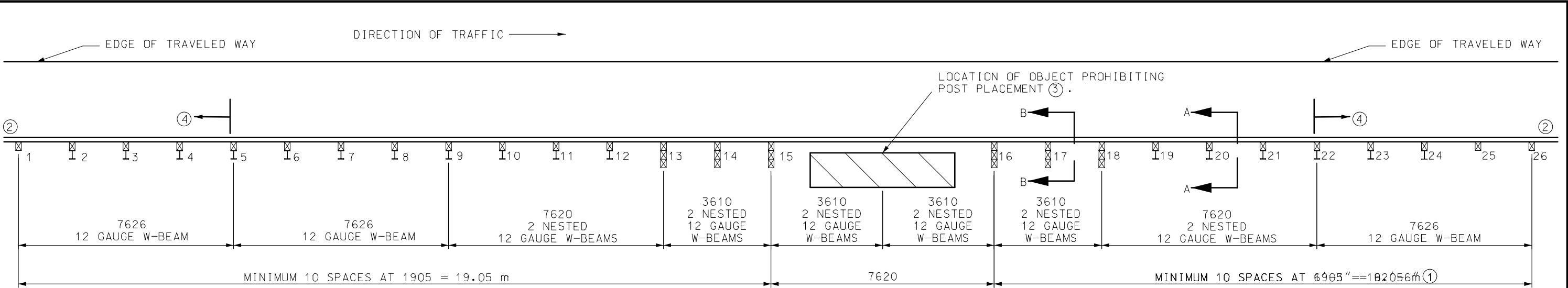
**GUARDRAIL
ANCHORED IN BACKSLOPE
GENERAL DETAILS**

DATE: _____

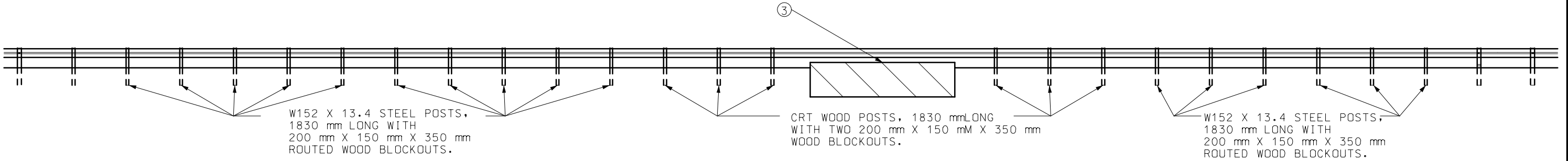
EFFECTIVE: 01-01-2005

M606.00AR

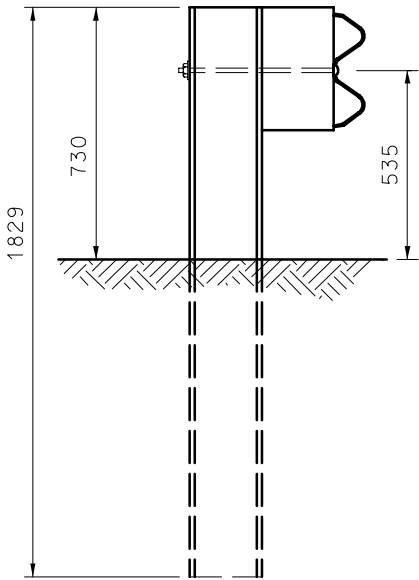
15
16



PLAN

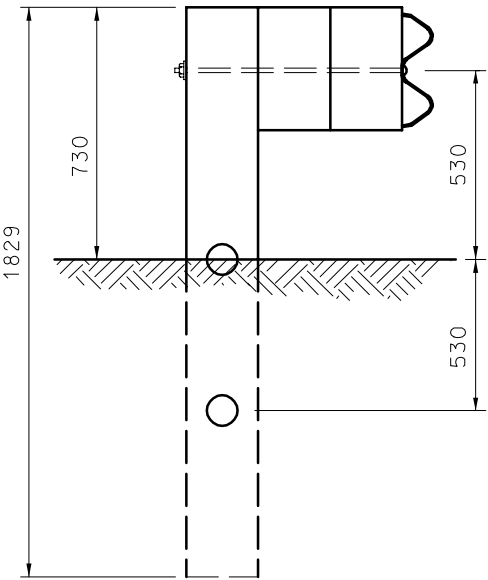


ELEVATION



SECTION A-A

W152 X 13.4 STEEL POSTS, 1830 mm LONG WITH 200 mm X 150 mm X 350 mm ROUTED WOOD BLOCKOUTS POSTS 3 THROUGH 12 AND 19 THROUGH 24.



SECTION B-B

CRT WOOD POSTS, 1830 mm LONG WITH TWO 200 mm X 150 mm X 350 mm WOOD BLOCKOUTS POSTS 13 THROUGH 18.

- ① IF LOCATED WITHIN THE CLEAR ZONE OF A TWO-WAY ROADWAY, THE MINIMUM LENGTH IS 26.67 m.
- ② ADDITIONAL GUARDRAIL AS REQUIRED, INCLUDING END TREATMENT.
- ③ THE POST MAY BE SKIPPED DUE TO THE PRESENCE OF AN OBSTACLE SUCH AS A CULVERT.
- ④ PLACE END TREATMENT NO CLOSER TO THE SKIPPED POST THAN POSTS 5 AND 22.

GENERAL NOTES:

ALL DIMENSIONS ARE SHOWN IN mm UNLESS OTHERWISE NOTED.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION			
		GUARDRAIL SKIPPING A POST (MODIFIED LONG-SPAN GUARDRAIL SYSTEM)	
DATE: _____	EFFECTIVE: 01-01-2005	M606.00AR	16 16